PIT AND QUARRY

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PERIODICAL DIVISION

APRIL, 1940

Combustion Control in Rotary Kilns . . . A.A.A. Agstone Specification Summary . . . Making Porous Concrete Drain Tiles for Grand Coulee Dam . . . Processing Pumicite in California

LUDLOW-SAYLOR

CONTROLLED-TEMPER SUPER-LOY

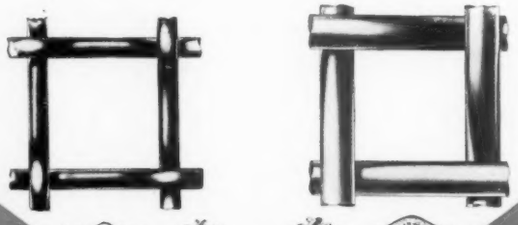
WOVEN WIRE SCREENS

for super-severe service

SUPER HARD, SUPER TOUGH,
SUPER STRONG

CONTROLLED TEMPER SUPER LOY SCREENS

withstand abrasion **longer**—
endure vibration **better**—
resist fatigue **to the utmost**



The background at top of page shows the "Perfect" Double-Crimp Weave.

The small cuts in the center panel compare Arch-Crimp Weave and Double-Crimp Weave.

The border at foot of page shows "Perfect" Double-Crimp Steel Wire Cloth which has been hot-dip galvanized after weaving.

Samples on request.

The LUDLOW-SAYLOR
WIRE COMPANY
SAINT LOUIS

● For smooth, dependable, low-cost conveying and power transmitting service—use Link-Belt chains. We make all types of malleable iron, Promal, steel, stainless steel, bronze and other alloy chains and are free to recommend the best one for the purpose . . . including sprockets, shafting, bearings, collars, clutches, take-ups, couplings; in fact, everything to make your installation give trouble-free, long-life service.

Today—throughout the world—Link-Belt chains are accepted as the recognized standard. They are backed by 65 years of chain making experience.

Large stocks are carried at Link-Belt plants and warehouses and by authorized distributors.

LINK-BELT COMPANY

Indianapolis · Chicago · Philadelphia · Atlanta · San Francisco · Toronto · Offices in Principal Cities

LINK-BELT CHAINS

7948

OF MALLEABLE IRON, PROMAL, BRONZE, STEEL, ALLOYS

PIT AND QUARRY, April, 1940, Vol. 32, No. 10. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago, Ill. Subscription price $1 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $1 additional for each year. Single copies 20 cents. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the act of March 3, 1897.

Compare the CRANE RATING when buying your next shovel— it is your only true measure of

STABILITY

Recently, a critical equipment buyer said the BAY CITY catalogs are the most complete, containing more real authentic data and less waste matter than any he had read on the subject of excavating equipment. By way of example we review some data taken from our catalog which is yours for the asking—no obligation.

	½-Yard Model 30	¾-Yard Model 45	1-Yard Model 62
Weight (Shovel)	30,000 lbs.	45,200 lbs.	64,000 lbs.
Crane Boom (Standard)	30′—0″	35′—0″	40′—0″
Crane Rating—15 ft. Radius	8,600 lbs.	14,400 lbs.	24,900 lbs.
Crane Rating—25 ft. Radius	4,200 lbs.	7,200 lbs.	12,200 lbs.
Power, 6 Cyl. Gas Standard	54 @ 1400	78 @ 1200	98 @ 1200
Shovel Boom	17′—0″	19′—0″	21′—0″
Dipper Sticks	12′—0″	14′—0″	16′—0″
45° Dump Height	14′—3″	16′—10″	18′—11″
45° Dump Radius	21′—1″	24′—2″	27′—2″
Crawler Width	8′—0″	9′—0″	9′—11″
Crawler Length	11′—0″	12′—6″	12′—10″

Experienced equipment buyers will agree that the only true measure of STABILITY—the only true measure of bucket capacity—is to check and compare safe crane ratings. If you keep this in mind you will not go wrong on your next purchase, whether it be for shovel, crane, dragline or trench hoe.

The higher crane ratings of the BAY CITY result from well balanced design plus long wide crawlers. There is no mystery about stability for it is a fundamental principle, known to all engineers and simply involves weight and tipping point. It costs us more money to build machines with higher crane ratings but they give you a bigger return in added performance.

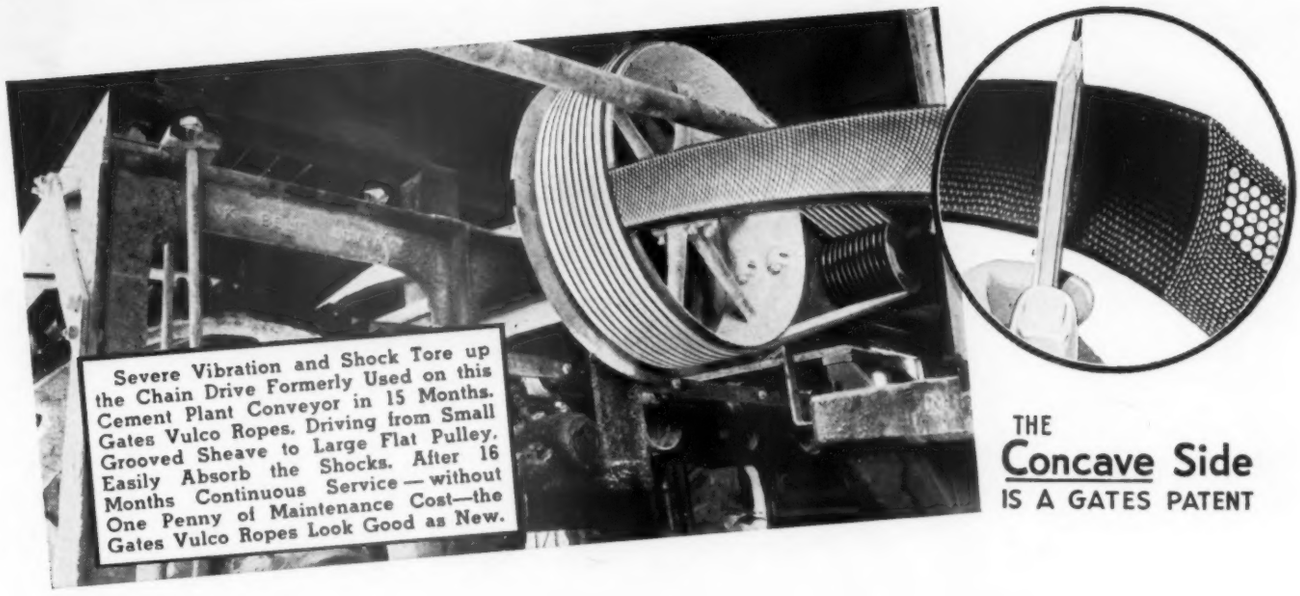
In addition to the added stability and higher crane rating of the BAY CITY look also at the added strength resulting from continued use of unit cast alloy steel heat-treated bases, with large diameter swing path which is standard in all models. Wider shovel working ranges are also possible through use of powerful one-piece chain crowd from front drum, through automatic chain take-up to sturdy shipper shaft.

Yes—we would like your shovel, crane, dragline and trench hoe business, either crawler or truck mounted. At least let us tell you more about these sturdy, powerful, easy to operate, money making convertible machines—write for Catalog H-3 containing 32 pages of photos and data.

BAY CITY SHOVELS, Inc.
BAY CITY, MICHIGAN
Export Office: 330 W. 42nd St., New York, N.Y. (OPARO)

BAY CITY

SHOVELS · CRANES · DRAGLINES · TRENCH-HOES · SKIMMERS



Severe Vibration and Shock Tore up the Chain Drive Formerly Used on this Cement Plant Conveyor in 15 Months. Gates Vulco Ropes, Driving from Small Grooved Sheave to Large Flat Pulley, Easily Absorb the Shocks. After 16 Months Continuous Service — without One Penny of Maintenance Cost—the Gates Vulco Ropes Look Good as New.

THE **Concave** Side
IS A GATES PATENT

Here's a Simple Fact

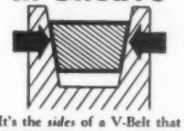
Prove it for Yourself and SAVE MONEY *on* V-BELTS *and* POWER

Pick up any V-belt having the ordinary straight sides and bend the belt. Three things will happen, right before your eyes.

(1) The top of the belt is under tension and grows narrower. (2) The bottom is under compression and becomes wider. (3) The sides of the belt bulge out. (Figure 1, at right).

This bulging of the straight sided V-belt in its sheave-groove costs you money in two ways—(1) The bulge causes uneven sidewall wear—shorter life! (2) The bulging side cannot evenly grip the sheavewall—a loss in transmission efficiency!

V-Belt in Sheave



It's the *sides* of a V-Belt that do all the *gripping* and get all the *wear*. That's why longer life for the *sides* means *longer life for the belt.*

In figure 2, you see how the precisely engineered concave side of the Gates Vulco Rope exactly corrects this bulging. Two distinct savings result. (1) The Gates Vulco Rope wears evenly—longer life! (2) The entire sidewall grips the pulley—carries heavier loads without slippage: saves the belts and also saves your power!

The Gates Vulco Rope is the only V-belt built with the patented concave side.

What Happens When a V-Belt Bends

FIG. 1

FIG. 2

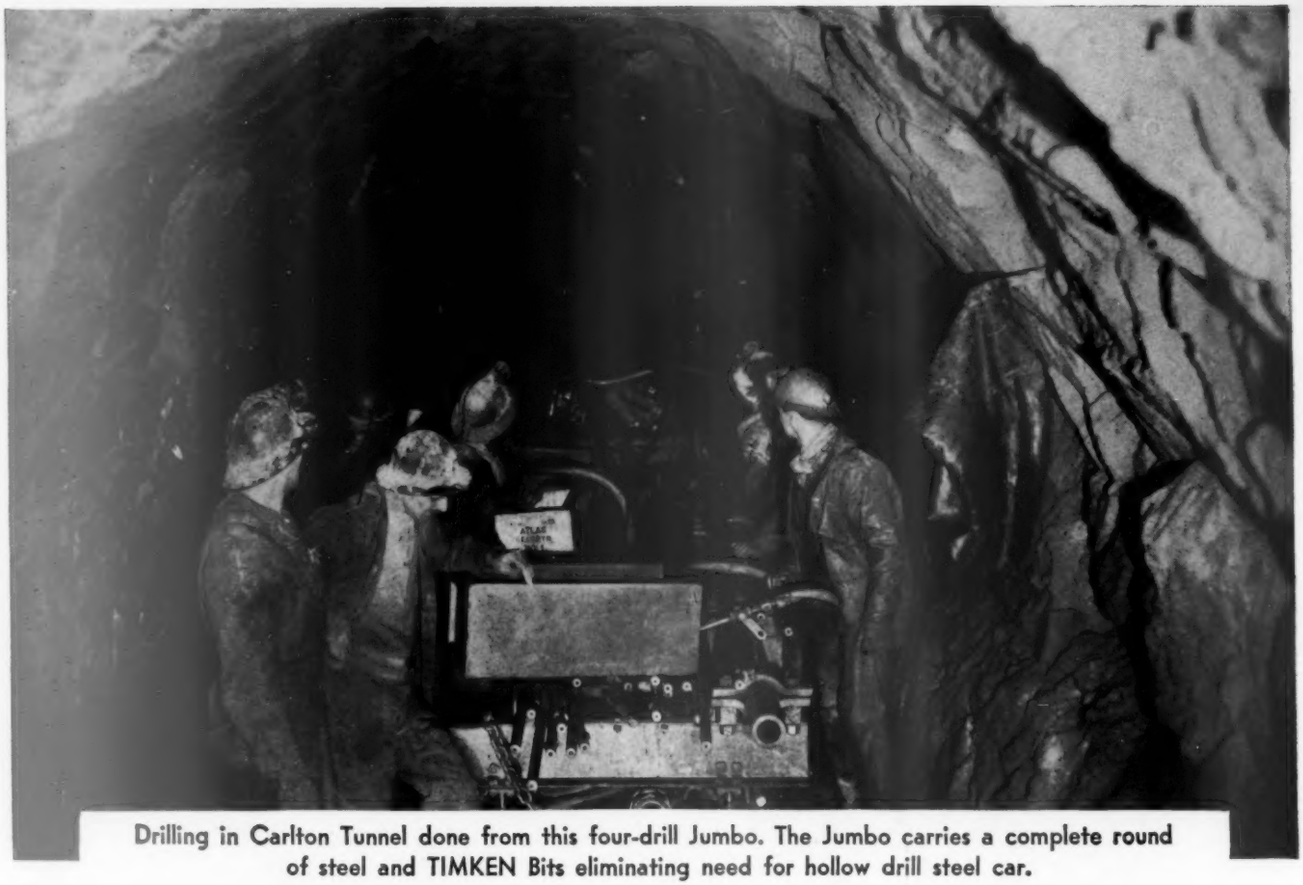
THE GATES RUBBER COMPANY

Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

CHICAGO, ILL., 1524 South Western Ave. HOBOKEN, N. J., Terminal Building BIRMINGHAM, ALA., 1631 1st Ave., S. LOS ANGELES, CAL., 741 Warehouse St.

DENVER, COLO., 999 South Broadway DALLAS, TEX., 2213 Griffin Street PORTLAND, ORE., 333 N. W. 5th Ave. SAN FRANCISCO, CAL., 2700 16th St.



Drilling in Carlton Tunnel done from this four-drill Jumbo. The Jumbo carries a complete round of steel and TIMKEN Bits eliminating need for hollow drill steel car.

TIMKEN* BITS SAVE $1.00 PER FOOT ON THIS 6 MILE TUNNEL JOB . . . . .

RBCO

TRADE-MARK REG. U.S. PAT. OFF.

What an assignment—tunneling a six mile hole, ten by eleven feet in section, through hard granite and aplite—both containing a high percentage of quartz! Yet, this assignment is being carried out at the rate of about 1,500 feet per month by the Golden Cycle Corporation on its Carlton Tunnel Project at Cripple Creek, Colorado! When completed the tunnel will lower the present water level 1,100 feet and thereby make workable a large area of rich ore.

TIMKEN Rock Bits were brought in on the job after two months of tunneling. Immediately drilling speed went up and drilling costs came down—*down to a saving of $1.00 per foot!*

The details that tell the story of TIMKEN Rock Bits performance and savings on the Carlton Tunnel project are too numerous to list here but we will welcome an opportunity to discuss them with you and also show what TIMKEN Bits will do on your job. Write us right now.

*TRADE-MARK REG. U. S. PAT. OFF.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

These Condor CONVEYOR BELTS Have Moved Millions of Tons

of rock, dirt, aggregates and concrete under all conditions at low cost

Condor Homo-Flex Conveyor Belt on TVA project, 30" wide, heavy duty.

ONE Condor Homo-Flex Conveyor Belt, built on a new engineering principle, handled 7,873,967 tons, another 5,682,149 tons of rock with sharp edges and a high proportion of heavy lumps.

On long and short hauls, the capacity and speed of handling of construction materials by Condor Homo-Flex Conveyor Belts is a cost-cutting method that any contractor with a tonnage job can use effectively.

Condor and MANHATTAN Conveyor Belts are made in sizes, grades and wear-resisting cover to fit the task. Consult our Engineering Department to have the benefit of the improvements and developments of continuous research. Meanwhile write for Bulletin 6862.

34" MANHATTAN Conveyor Belt on largest traveling stacker.

30" Conveyor Belt, 322 ft. long on large concrete construction.

These conveyor belts handle gravel. One is 720½ ft. long, 16", 4-ply.

A 22" Concrete Belt Conveyor, 3-ply, ⅛" top cover.

Condor PRODUCTS

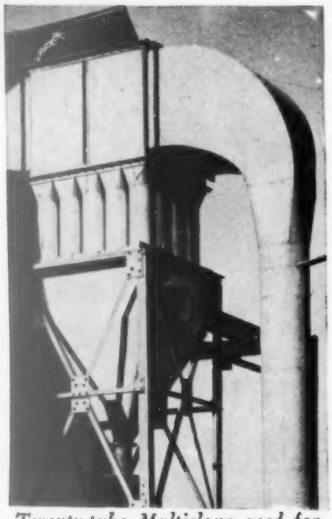
Compensated Belt	Garden Hose	Water Hose
Conveyor Belt	Hydraulic Hose	Air Tubing
Standard Belt	Oil and Gasoline Hose	Dredge Sleeves
V-Belt	Packers Hose	Chute Lining
Acid Belt	Paper Mill Hose	Launder Lining
Air Belt	Sand Blast Hose	Industrial Brake Lining and Brake Blocks
Brewers Hose	Sand Suction Hose	Textile Mill Specialties
Contractors Hose	Spray Hose	Abrasive Wheels
Creamery Hose	Steam Hose	Bowling Balls
Fire Hose		

MANHATTAN Grader Belt on road construction.

Condor Belt conveying stone from crusher to storage—730 ft. long.

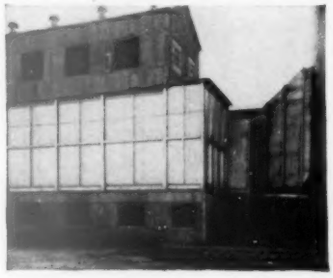
This 36", 5-ply belt carries 600 tons per hour, 413 f. p. m. — 420 ft. long.

THE MANHATTAN RUBBER MFG. DIVISION
OF RAYBESTOS-MANHATTAN, INC.
EXECUTIVE OFFICES AND FACTORIES
18 Townsend St., Passaic, N. J.



Twenty-tube Multiclone used for plant clean-up. High efficiency, low power cost, low draft loss. Compact, all metal, fireproof.

Cottrell Electrical Precipitator recovering cement dust values from kilns and abating a nuisance at the same time.



INDUSTRY CLEANS HOUSE FOR HEALTH AND PROFIT

MODERN factory managers want clean plants. They fight air contamination for moral and monetary reasons—for the elimination of hazards to health and property, and for the recovery of fugitive values in production operations.

• For 34 years Cottrell Electrical Precipitators have been the only universal method for the control—not only of dust—but also of industrial fog, fume and mist. The first installation for the collection of sulphuric acid mist at a smelter is still operating without change. More than 3,000 plants are Cottrell equipped.

• Technical text books give unbiased endorsement to Cottrells for gas cleaning and for the recovery of gold, silver, copper and other elements from refinery fume —for cleaning blast furnace gas—collecting fly ash and cement dust—removing tar, oil and water from manufactured fuel gases—salvaging sodium salts from paper mill black liquor—collecting phosphoric acid, zinc oxide, carbon black and other process powders in the chemical industries.

• Cottrells are available in any capacity from a few hundred c.f.m. to millions. They can be guaranteed to any required efficiency based on total solids or liquids entering the collector, handling hot or cold gases, in wet or dry operation.

• Cottrells have in large measure made possible the slogan: "A Clean Plant is a Sign of Progress."

Write for new brochure giving amazing performance facts about Cottrells in every industry.

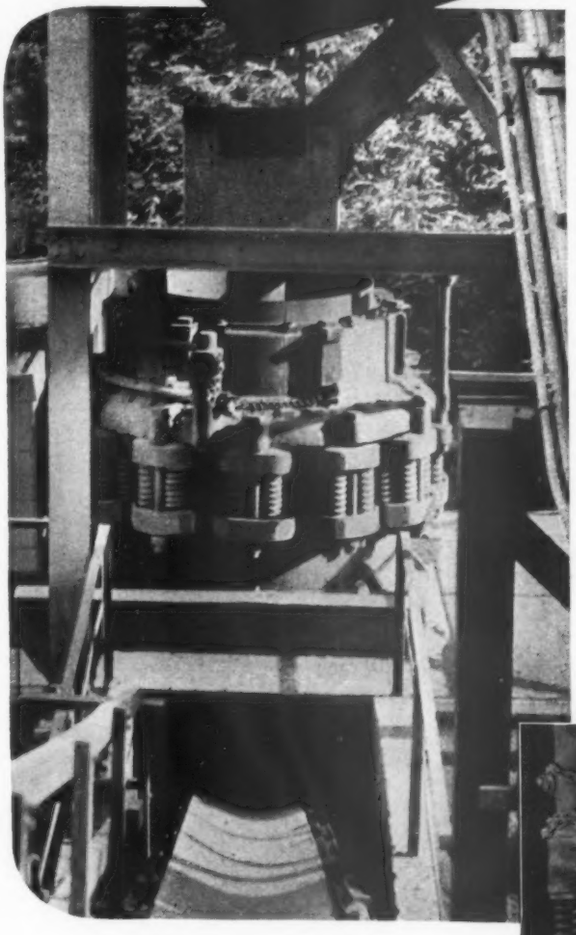
WESTERN PRECIPITATION CORPORATION
1016 W. 9th St., Los Angeles • Chrysler Bldg., New York

PRECIPITATION COMPANY OF CANADA, LTD.
Dominion Square Building Montreal, Quebec

PIONEERS IN DUST AND FUME CONTROL

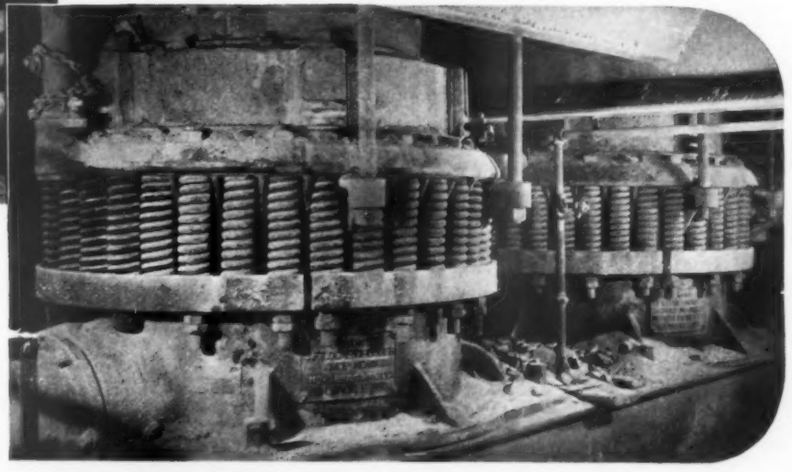
COTTRELL ELECTRICAL PRECIPITATORS **MULTICLONE** MECHANICAL COLLECTORS

SYMONS SHORT HEAD CONE—*now supplies that finer sized stone*



A four-foot Short Head Cone makes the minus ¾ inch material.

Here is another instance where a Symons Short Head Cone has been added to meet the changing demand for finer crushed material. The two Standard Cones were originally installed to take a 2 to 4 inch feed and make all the finer sizes then required. With an increased use of more material ranging in sizes from minus ¼ inch to minus ¾ inch, the Standard Cones are now only making the ¾ to 1½ inch sizes, while the Short Head Cone is taking the discharge from the Standards and supplying the finer products. The Short Head Cone is arranged to operate independently of the main plant, taking the surplus of any size in storage and readily producing any of the finer sizes for which there is a ready market. This combination of Symons Standard and Short Head Cones permits of greater flexibility and economy of operation and a lower crushing cost, and is the answer to meeting present day demands for the finer sizes of crushed materials.



Two four-foot Standard Cones do the ordinary reduction crushing.

NORDBERG MFG. CO. MILWAUKEE WISCONSIN

NEW YORK CITY, 60 E. 42nd St. • LOS ANGELES, Subway Terminal Bldg. • TORONTO, Concourse Bldg. • LONDON, Bush House

MANGANAL
REG. U. S. PAT. OFFICE

11 to 13½% Manganese Nickel Steel

WELDING ELECTRODES

Bare for D.C. Welding

Tite-Kote for A.C. and D.C. Welding

APPLICATOR BARS

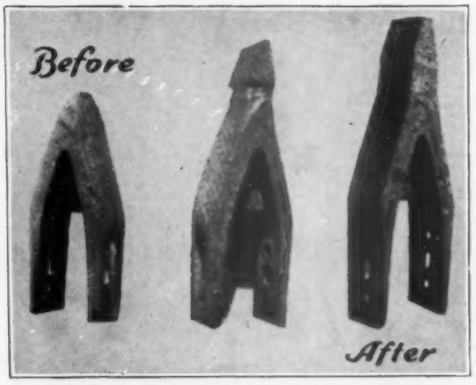
Round, square and flat for building up worn Roll, Gyratory, Jaw and Cone Crushers, Sand and Gravel Pumps, etc. Special shape (four sizes) for replacing worn Grousers on Tractor Treads.

HOT ROLLED PLATES

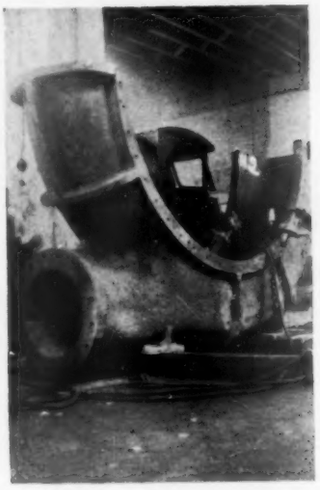
3/16" to 1" thick, for patching and reinforcing worn or broken Power Shovel Buckets, and for fabricating parts that must stand severe impact and abrasion.

CAST WEDGE BARS

For repointing worn down Shovel and Dipper teeth. Cheaper and better than new.



1 piece of Cast Wedge Bar attached to a worn down tooth with Manganal Bare or Tite-Kote welding restores the tooth to its normal shape and size ready for use again.



Manganal Applicator Bars and Welding will return your Pumps, Impellors and Side Plates to service at far less than the cost of new ones.

Applicator Bars on worn down mantel for low cost and quick buildup. Applicator Bars (round, 5/16" to 1½") (Square, ½", ⅝", ¾", 1", 1⅛") can be supplied in any shape or size.

SOLE PRODUCERS

STULZ-SICKLES CO.

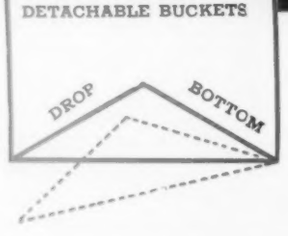
134 LAFAYETTE STREET NEWARK, N. J.

WRITE US FOR NAME OF NEAREST DISTRIBUTOR

LF-2 . . . ONE OF THE NEW MODELS

DEMPSTER DUMPSTER

DEMPSTER-DUMPSTER Pays Its Own Way . . . Is Self-Liquidating . . . Turns Losses Into Profits. Get the Facts NOW! There's a Dealer Near You.



- No High Pressure Hose
- No Counterweight
- No Auxiliary Jacks

DEMPSTER-DUMPSTER is the spearhead of attack against operating wastes. One unit can serve four to ten buckets . . . does the work of four or five trucks. No wasted man-hours, no idle labor. The DEMPSTER-DUMPSTER is never idle on the job, constantly on "the go," no lost motion, no waiting for it to be loaded and returned. Buckets handle up to 6 yards, depending upon the material. Costly breakdowns are unknown with DEMPSTER-DUMPSTER on the job. Simply constructed of rugged materials, DEMPSTER-DUMPSTERS have been in service for more than 6 years without a major breakdown. Write for complete details. Just ask for Bulletin No. 501.

Exclusive sales territory available for responsible dealers. Write for details.

DEMPSTER BROTHERS, Inc. KNOXVILLE, TENNESSEE

Announcing the 54-B STRIPPER

Latest addition to the line of modern Bucyrus-Erie strippers is the 2-yard 54-B. This machine fits the need of small and medium-size pits for a long-range, light-weight stripper with big output capacity. The unusual combination of range and stability is achieved through use of the same type of strong light boom made so famous by the 33-yard 950-B. Ample power, made fully available through Bucyrus-Erie Direct Control makes it easy to get capacity output without strain on machine or operator. Write for bulletin on this new Bucyrus-Erie stripper.

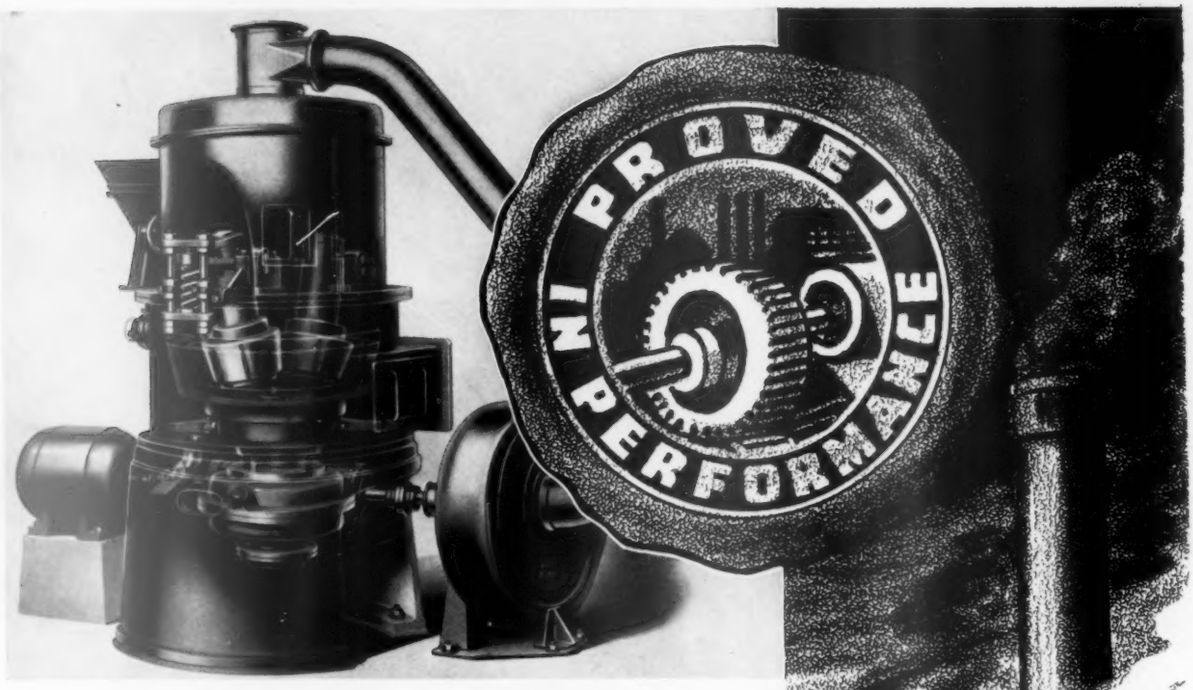
54-B features

Conical hook swing rollers, no center pintle . . . 36-inch swing clutches, direct hand-set for maximum control . . . 207 h.p. diesel engine . . . compact, easily accessible main machinery . . . easy-acting responsive control levers . . . full-vision cab . . . twin rope crowd . . . tubular inside dipper stick of 950-B type . . . famous Bucyrus-Erie propel and self-clearing 36-inch cats.

D40

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN



INDUSTRY puts its Seal of Approval on the Raymond BOWL MILL

These figures speak for themselves, and for the Bowl Mill: Five years on the market . . . over 300 installations averaging better than one per week . . . 30% repeat orders . . . mills operating in 27 states, and 4 foreign countries . . . firing rotary kilns, furnaces and boilers. That is what industry thinks of the Bowl Mill in terms of purchases.

BOWL MILL

Producers of lime and cement can profit by the use of the Bowl Mill because of its ability to handle any grade of coal . . . maintain uniform fineness . . . give better control over the coal-air mixture . . . improve kiln operation and reduce coal preparation costs 30% to 60% as compared to the central bin system.

Be sure to investigate this modern method of direct firing rotary kilns. Write for catalog, which describes the unique principle of pulverizing without metal-to-metal contact between the grinding elements . . . the easy adjustments and automatic lubrication . . . the quiet operation, power economy and record low maintenance of less than 1¢ per ton of coal ground.

RAYMOND PULVERIZER DIVISION
COMBUSTION ENGINEERING COMPANY, INC.
1321 North Branch Street **CHICAGO**
Sales Offices in Principal Cities • • • In Canada: Combustion Engineering Corporation, Ltd., Montreal

A NEW 1 YARD SHOVEL by NORTHWEST

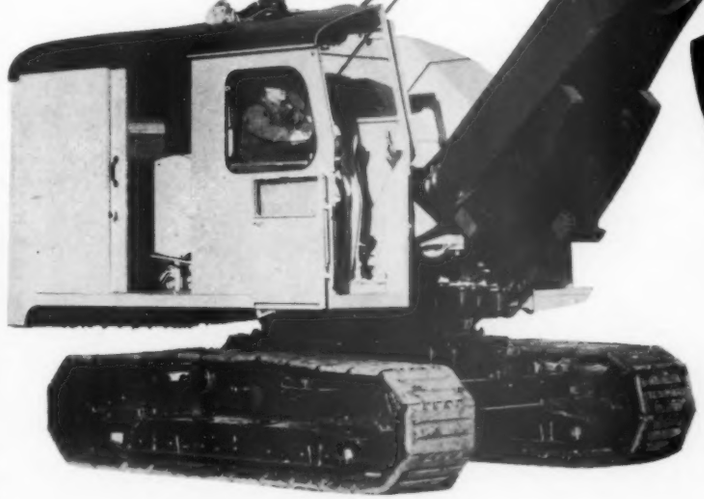
Model 41

– *EQUIPPED with all* of these Northwest features – proved in the field, in actual service! Helical Gear Drive, Uniform Pressure Swing Clutches, "feather-touch" Clutch Control, Cushion Clutch, Dual Crowd, Northwest Welded Boom and Dipper Sticks, Ball or Roller Bearings on all high speed shafts, Worm Boom Hoist, Northwest mobility, travel mechanism fully enclosed and running in oil.

– Like all Northwests – a *real* Rock Shovel!

– And when you have a real Rock Shovel you never have to worry about output.

NORTHWEST ENGINEERING COMPANY
1822 Steger Building
28 East Jackson Boulevard
Chicago, Illinois



Easily Convertible to CRANE, DRAGLINE or PULLSHOVEL

Like All NORTHWESTS– A Real ROCK SHOVEL

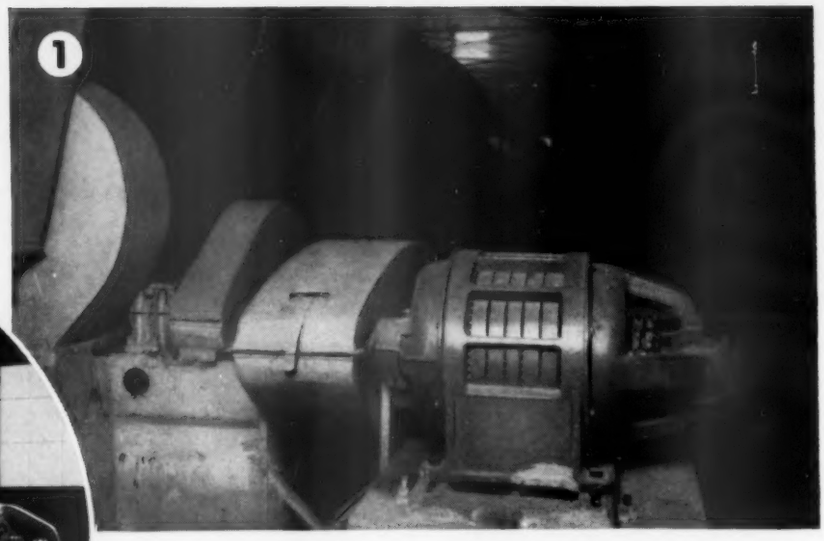
GASOLINE • ELECTRIC • DIESEL • OIL

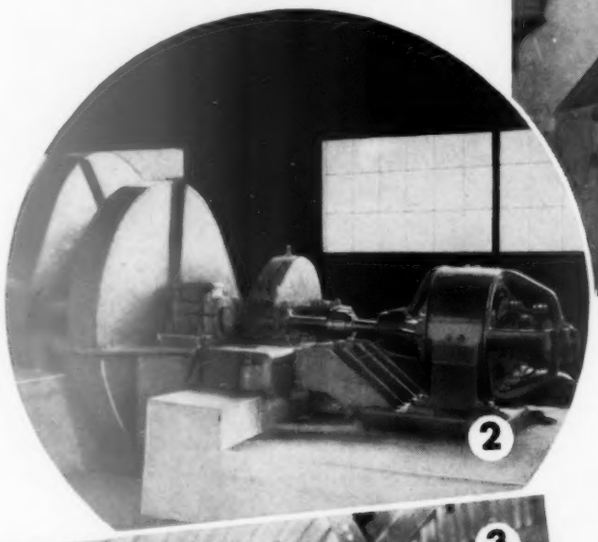
Built in a range of 18 SIZES 3/8 yd. capacity and Larger

–and when you have a real Rock Shovel you won't have to worry about output

General Electric PRESENTS NOT ONE---NOT TWO--

1. G-E WOUND-ROTOR (SLIP-RING) MOTORS are popular throughout the cement industry. They operate on an a-c power supply, they have the high starting torque that is so desirable in a kiln drive, and their speed can be varied over a considerable operating range. Here's one—100 hp, 375/750 rpm—driving one of the four 250-foot kilns in a New York plant

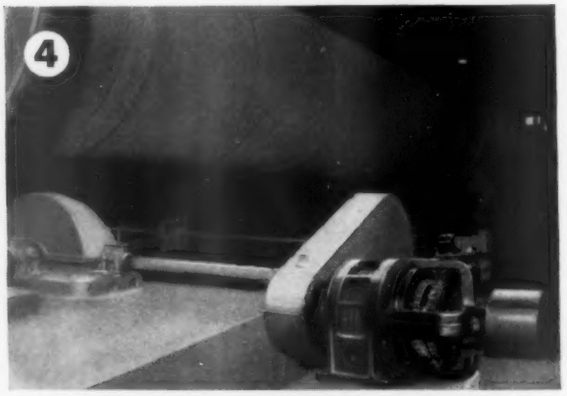




2. G-E DIRECT-CURRENT MOTORS WITH FIELD CONTROL give very close speed adjustment over a wide range, have ample starting torque, and can be powered directly from any d-c bus. They are well suited to the modern requirements of a one-kiln plant. Picture shows a G-E Type CD 75-hp, 600/1200-rpm d-c motor driving kiln in a Texas plant

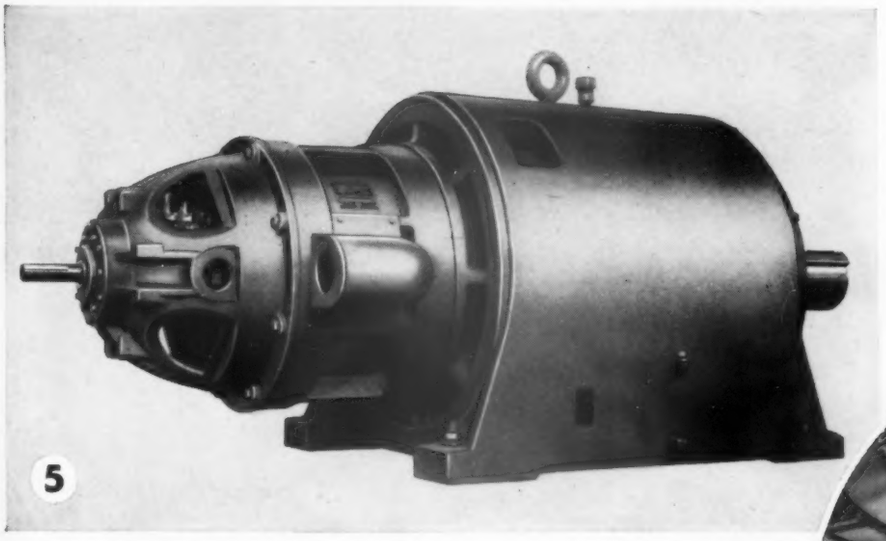
3. G-E DIRECT-CURRENT DRIVE WITH ADJUSTABLE-GENERATOR-VOLTAGE CONTROL provides ideal starting conditions and smooth, flexible speed control. This system eliminates the need for special feeder synchronizing equipment. Motors for any kiln and feeder combination are powered and controlled from a separate generator, making the system particularly adaptable to a multi-kiln plant. Here is an installation view showing a G-E d-c kiln motor with direct-geared tachometer generator

4. G-E ADJUSTABLE-SPEED, BRUSH-SHIFTING MOTORS enable you to use alternating-current power and at the same time get the flexible speed control that is usually associated with d-c drive. Here is one of these motors —Type BTA—shown driving a kiln in a modern plant



But Six---

Dependable Kiln Drives That Meet ALL Modernization Requirements



HERE they are—six General Electric kiln drives from which you can select the one that fits your modernization requirements best. But you don't have to make the selection unaided. G-E engineers will be glad to work with you and your consulting engineers in studying operating conditions and making recommendations. Just get in touch with our nearest representative. General Electric Co., Schenectady, N. Y.

5. G-E GEAR-MOTOR DRIVE is attracting the attention of cement-mill men because it saves space, reduces installation costs, contributes to safety of operation, and has the desirable characteristics of a normal-speed drive—all important points to be considered. A continuous oil bath for the gears assures long life of parts, consequently long, low-cost service. This G-E wound-rotor gear-motor was built for an Eastern cement plant

6. G-E STANDARD SQUIRREL-CAGE MOTORS have the advantages of low first cost and an exceedingly simple construction that contributes to trouble-free operation. When adjustable speed is not a primary consideration, you can obtain successful service with this type of drive. This picture shows a typical installation. It's a G-E 50-hp induction motor driving a kiln in a Tennessee plant

GENERAL ELECTRIC

652-1

PUT THE BRAKES ON HIGH ROPE COSTS!

Lowest general-average rope operating cost is assured through the use of Roebling "Blue Center" Wire Rope. The result of continuous research and development, this rope is the finest product of Roebling's unexcelled research, steel-making and rope-fabricating facilities. Ask about Roebling's "Blue Center" Wire Rope... either standard or preformed.

JOHN A. ROEBLING'S SONS COMPANY, TRENTON, N. J.
BRANCHES IN PRINCIPAL CITIES

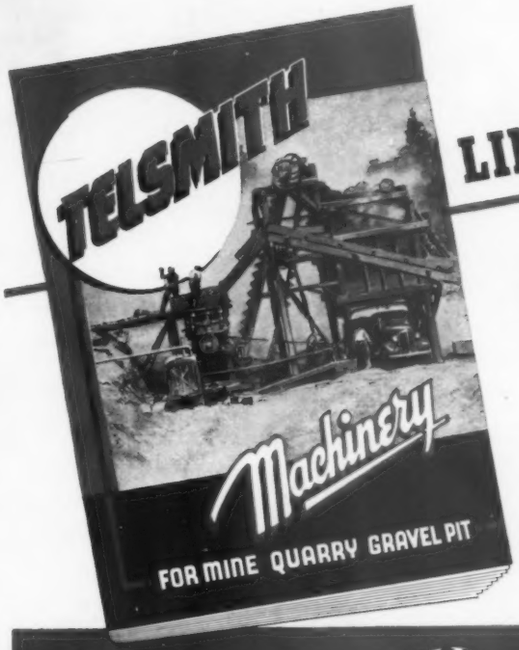
STRONGER—Wire of highest strength consistent with ductility and toughness

TOUGHER—Provides maximum resistance against wear, sudden shocks, vibration

SAFER—Unequalled for uniformity of quality

SAVING—Insures lowest general average operating cost

THE HIGHEST DEVELOPMENT IN ROEBLING WIRE ROPE



LINE UP YOUR 1940 EQUIPMENT

Get this Guide FREE

● Time to look over your plant — get your equipment all lined up so that 1940 will be a big money-making year. Here's just what you need to do the job right — the Telsmith Equipment Guide.

It will tell you *what's new* in rock, ore and gravel handling machinery — exactly which type, model or size best fits your special need ... and why. 36 pages ... with illustrations to tell you what words can't. And it's yours, *free for the asking!*

You'll want to see Telsmith's new developments — equipment that embodies every modern feature of design — from the standpoint of speed, capacity, trouble-free operation and lower up-keep.

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504 EAST CAPITOL DRIVE • MILWAUKEE, WISCONSIN

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New York City

Gordon Russell, Ltd., Vancouver
211 W. Wacker Drive
Chicago, Ill.

713 Commercial Trust Bldg.
Philadelphia, Pa.

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Cambridge, Mass.

Brandeis M. & S. Co.
Louisville, Ky.

Vem Wheeler Equip. Co.
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Roanoke Trac. & Equip. Co.
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Choctaw C. & M. Co.
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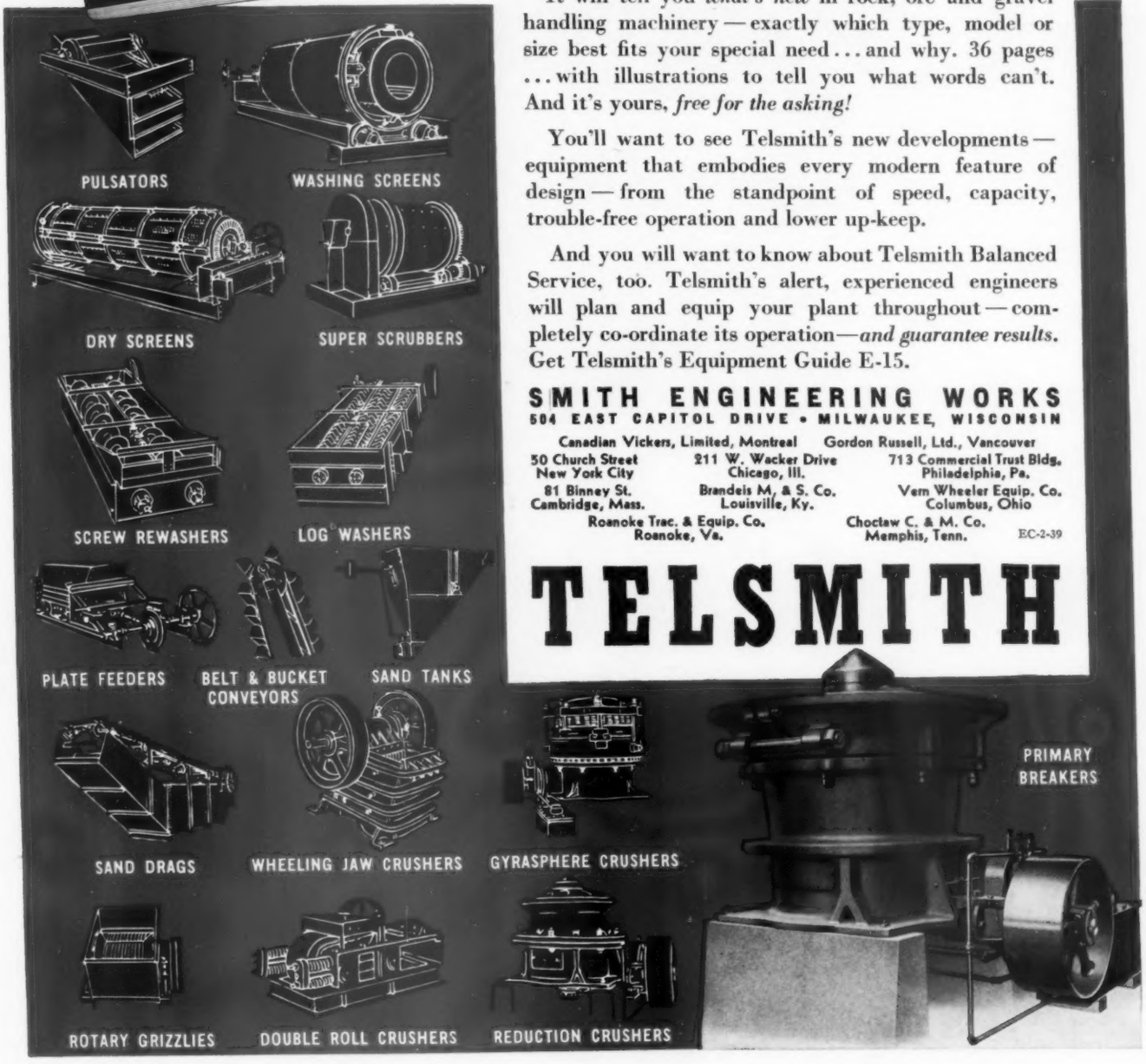
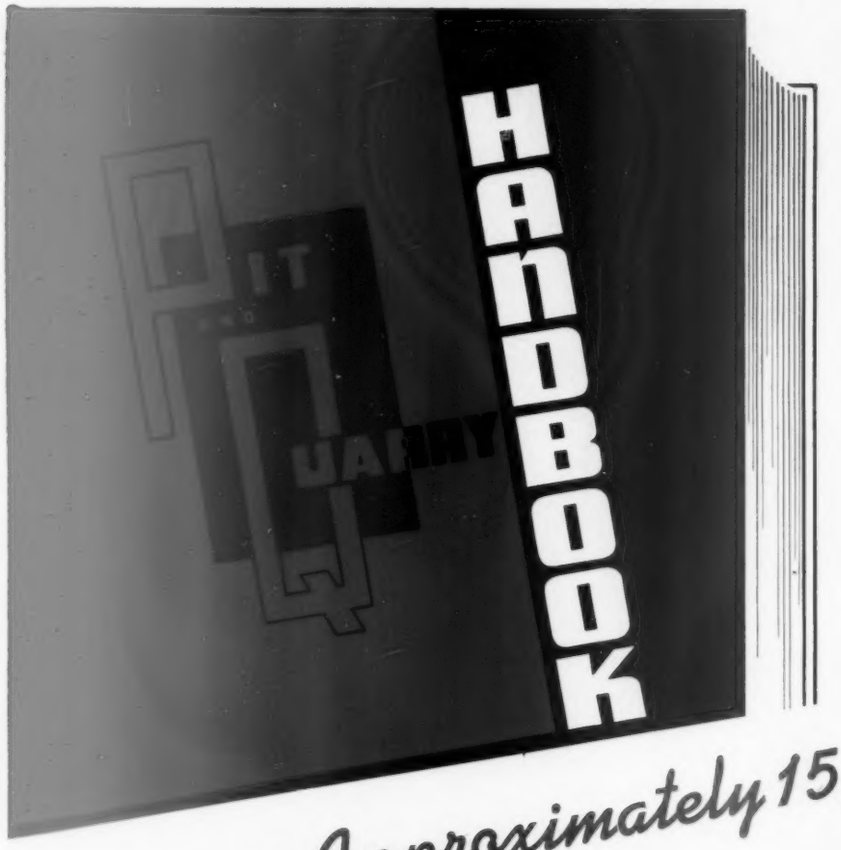
EC-2-39

TELSMITH





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Don't Waste Your Time and Postage on an Old List

The compilers of the 1940 Directory Section of Pit and Quarry Handbook have labored painstakingly to build an accurate list of all known American producers of nonmetallic minerals. Each new listing has been carefully scrutinized for accuracy and completeness. Previous listings have been revised, checked, double-checked. All appear two ways—(1) alphabetical by companies, (2) geographical by plants. It gives you company names, officers, location of plants, size or capacity, and names of the men who do the buying. Select the complete Handbook *and* Directory, or the convenient, flexibly-bound Directory alone. Now ready for distribution. Order NOW to insure getting one of the first copies. Use coupon below . . . we'll bill you after you get the book.

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538 S. Clark St., Chicago, Ill.

Please send.....copies of the 1940 HANDBOOK ($10.00 per copy) ☐ Check enclosed.....

Please send.....copies of the 1940 DIRECTORY ($10.00 per copy) ☐ Send Invoice with book

Name ..... Title.....

Company .....

Town ..... State.....

Handles Easier

Regardless of Application

HAZARD LAY·SET *Preformed* Handles Easier

Whether it is on a carryall, dragline, concrete mixer, power shovel, clamshell, skip hoist—or what not—Hazard LAY-SET Preformed is appreciated by the workmen *because it handles easier*. The preforming process, back at the mill, gives it that advantage. Preforming eliminates internal strain thereby making LAY-SET limber, flexible, easy to reeve. Therefore, LAY-SET resists kinking, resists rotating in sheave grooves, resists the fatigue of bending. LAY-SET requires no seizing as it won't fly apart when cut.

Crown wires that finally wear through will not porcupine to tear workmen's hands and possibly cause blood poisoning. This makes Hazard LAY-SET Preformed a *safer* rope to use. Small wonder the workmen like it.

The bosses in the office like it, too, for the records reveal that Hazard LAY-SET Preformed lasts longer. *Much* longer. That means less frequent rope replacements and shutdowns—more work done.

Specify Hazard LAY-SET Preformed for your next line. All Hazard ropes made of Improved Plow Steel are identified by the Green Strand—and remember, Green Signifies Safety for both men and pocketbook.

HAZARD WIRE ROPE DIVISION

Established 1846

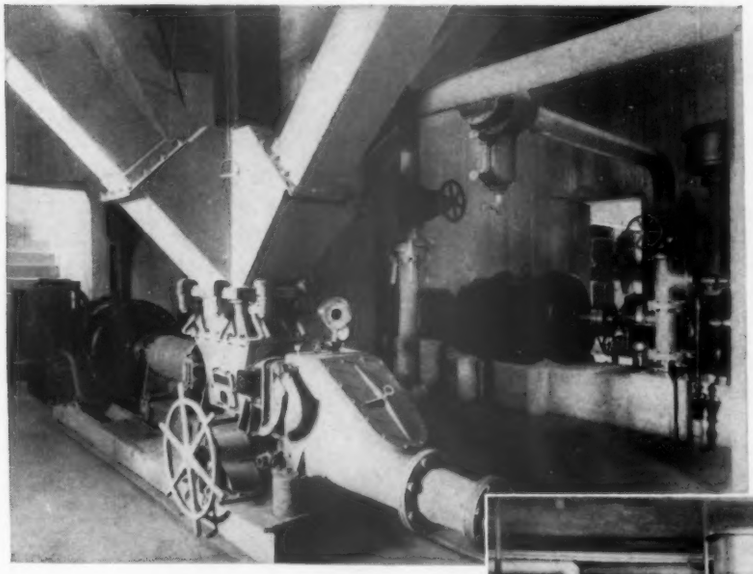
AMERICAN CHAIN & CABLE COMPANY, INC., WILKES-BARRE, PA.

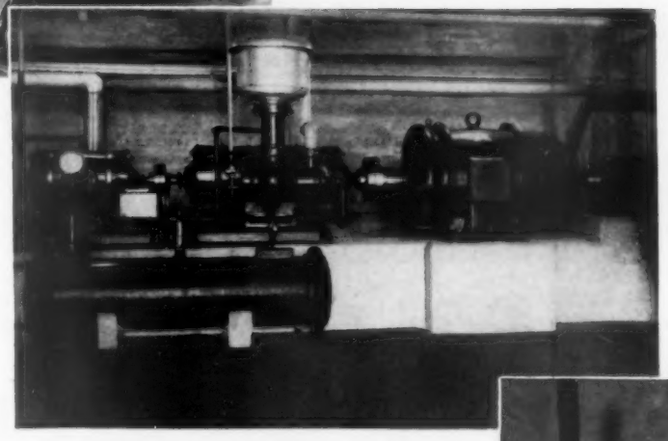
District Offices: New York, Chicago, Philadelphia, Pittsburgh, Fort Worth, San Francisco, Denver, Los Angeles, Atlanta, Tacoma

Another FULLER-KINYON PUMP

AND

FULLER ROTARY COMPRESSOR INSTALLATION





Above—Fuller-Kinyon Portable Cement Pump for conveying cement from silos to packer bins. Fuller Rotary Single-stage Compressor in background, furnishing air for Fuller-Kinyon Pump. Right—Fuller Rotary Two-stage Compressor furnishing air for Fluxo Conveying System. Lower right—Fuller Rotary Single-stage Compressor, furnishing air for slurry agitation.

ANOTHER Fuller installation, thousands of miles away, attesting to the confidence placed in this equipment to give lasting, trouble-free service and continuous performance day in and day out. In this modern, up-to-date cement plant in South America, Fuller equipment was selected and installed, as follows:

Two 7" Type H Fuller-Kinyon Portable Pumps; conveying cement from silos to packer bins. Also for recirculating.

Two 4" Type H Fuller-Kinyon Stationary Pumps; conveying packer spill to packer bins.

One Two-Stage Fuller Rotary Compressor; air for Fluxo Conveying System.

One Single-Stage Fuller Rotary Compressor; air for slurry agitation.

Two Single-Stage Fuller Rotary Compressors; air for Fuller-Kinyon Pumps.

Of course, Fuller-Kinyon Pumps have long been accepted as standard practice in the cement industry; and now, more and more Fuller Rotary Compressors, due to their inherent characteristics and advantages, are being installed in cement and other industrial plants.

FULLER COMPANY

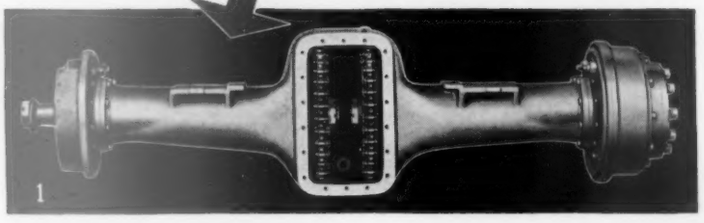
CATASAUQUA, PENNSYLVANIA

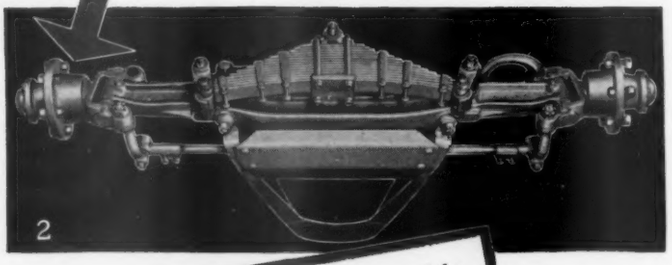
Chicago: Marquette Bldg. San Francisco: Chancery Bldg.

G-15

FULLER-KINYON, FLUXO, AND AIRVEYOR CONVEYING SYSTEMS · · · · ROTARY FEEDERS AND DISCHARGE GATES
ROTARY AIR COMPRESSORS AND VACUUM PUMPS · · · · AIR-QUENCHING COOLERS · · · · BIN SIGNALS

HUSKY AXLES FOR HEAVY LOADS





KOEHRING DUMPTOR UP-KEEP COST LOW

Low up-keep cost increases the job-profit. Husky Dumptor axles carry big heavy pay-loads of rock and dirt . . . often 24 hours per day. More than enough strength is built into the axle assemblies for the toughest hauling job . . . to provide long-lasting service without breakage. Repair costs are surprisingly low . . . with Koehring Dumptors hauling rock and dirt . . . *and so is the cost per yard moved.* Use Koehring Dumptors on your next job!

KOEHRING CO • MILWAUKEE, WIS.

1. Alloy steel drive axles housed in one piece alloy steel casting. Anti-friction bearings, splined shafting, alloy steel sprockets and chain.

2. Free oscillating, spring mounted, steering axle eliminates frame bending strains, when traveling over uneven grades.

KOEHRING HEAVY DUTY

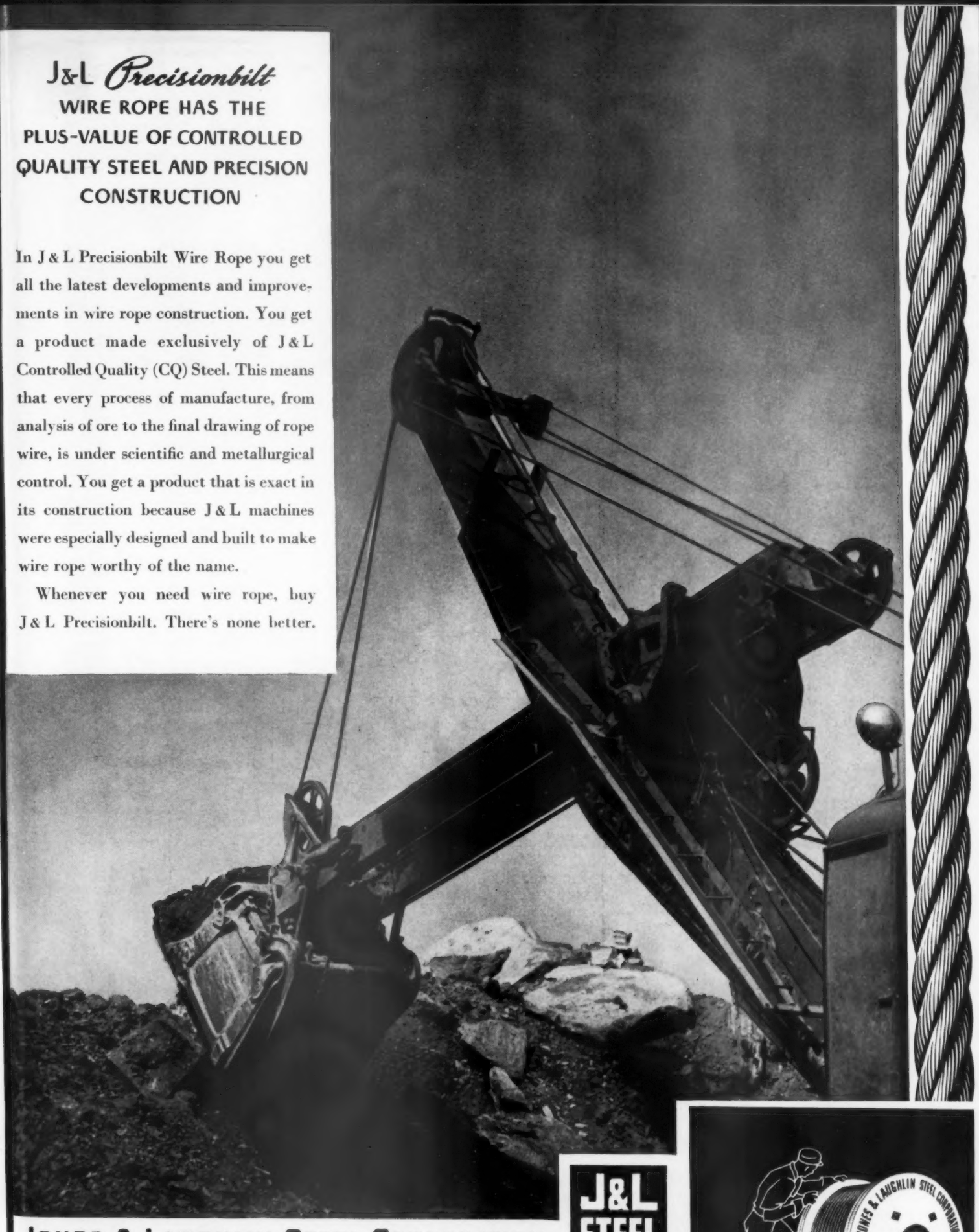
HEAVY-DUTY CONSTRUCTION EQUIPMENT

J&L *Precisionbilt*

WIRE ROPE HAS THE PLUS-VALUE OF CONTROLLED QUALITY STEEL AND PRECISION CONSTRUCTION

In J & L Precisionbilt Wire Rope you get all the latest developments and improvements in wire rope construction. You get a product made exclusively of J & L Controlled Quality (CQ) Steel. This means that every process of manufacture, from analysis of ore to the final drawing of rope wire, is under scientific and metallurgical control. You get a product that is exact in its construction because J & L machines were especially designed and built to make wire rope worthy of the name.

Whenever you need wire rope, buy J & L Precisionbilt. There's none better.



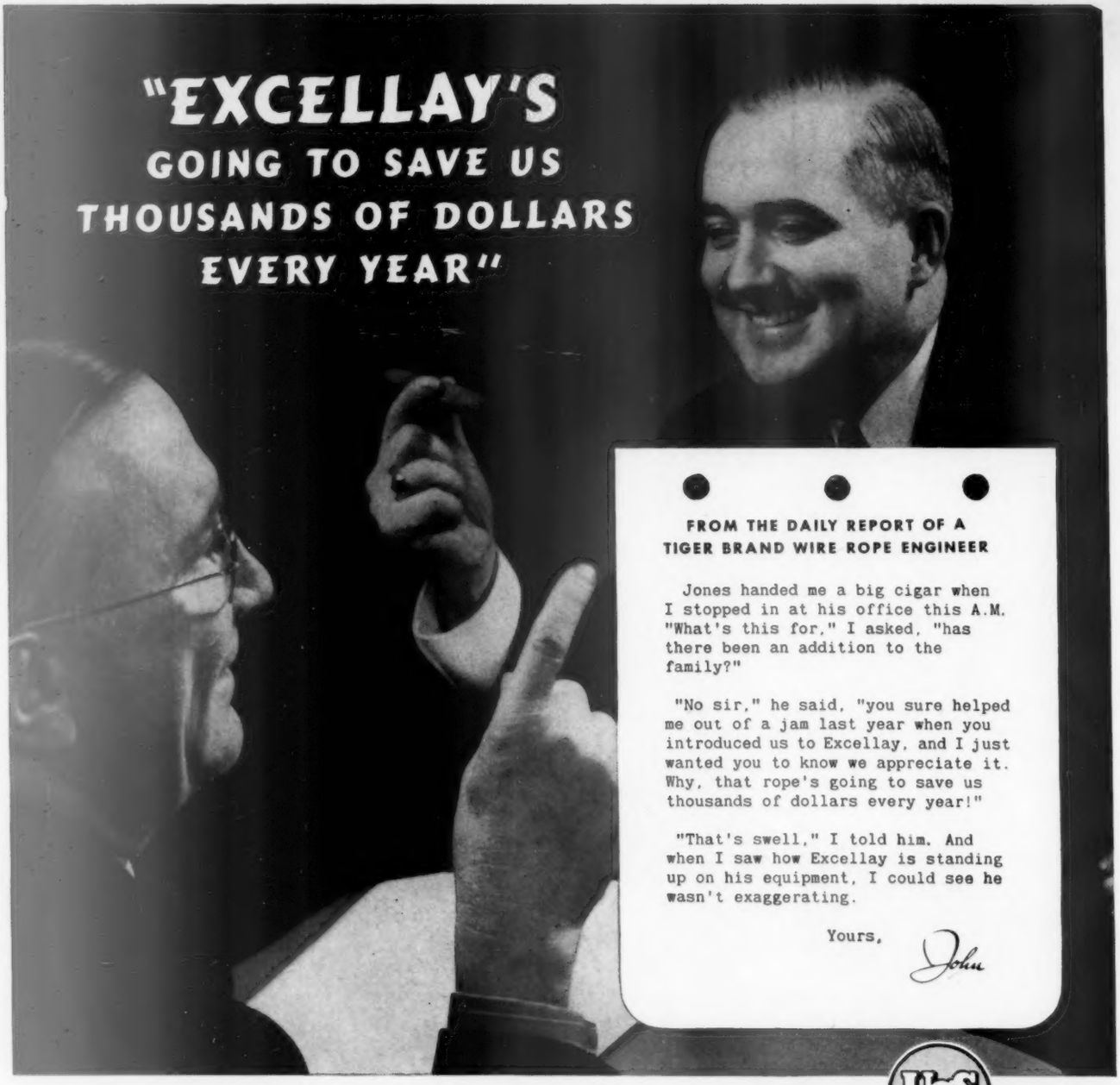
J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS

GILMORE WIRE ROPE DIVISION

PITTSBURGH, PENNSYLVANIA


"EXCELLAY'S
GOING TO SAVE US
THOUSANDS OF DOLLARS
EVERY YEAR"
FROM THE DAILY REPORT OF A
TIGER BRAND WIRE ROPE ENGINEER
Jones handed me a big cigar when I stopped in at his office this A.M. "What's this for," I asked, "has there been an addition to the family?"
"No sir," he said, "you sure helped me out of a jam last year when you introduced us to Excellay, and I just wanted you to know we appreciate it. Why, that rope's going to save us thousands of dollars every year!"
"That's swell," I told him. And when I saw how Excellay is standing up on his equipment, I could see he wasn't exaggerating.
Yours,
John

WHEREVER wire rope is used, you can be sure that not far away is one of the arms of the American Steel & Wire Company, the Tiger Brand Wire Rope Engineer.

What these men accomplish is no mystery to the thousands of wire rope users they contact every year. They know your problems, they talk your language. Their job is to help you select the best wire rope for a given task—to help you put wire rope to the most effective use—in short, to help you get a full dollar's worth of performance out of every dollar you invest in wire rope.

Get to know your American Tiger Brand Engineer better. He's in position to give you practical, down-to-earth, money-saving assistance. If for any reason you are not being contacted by one of these engineers, write or call us and you'll learn the true meaning of real wire rope service.

USS

EXCELLAY
Preformed
WIRE ROPE

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York

COLUMBIA STEEL COMPANY
San Francisco

United States Steel Export Company, New York

UNITED STATES STEEL

SET FOR THE LONG HAUL

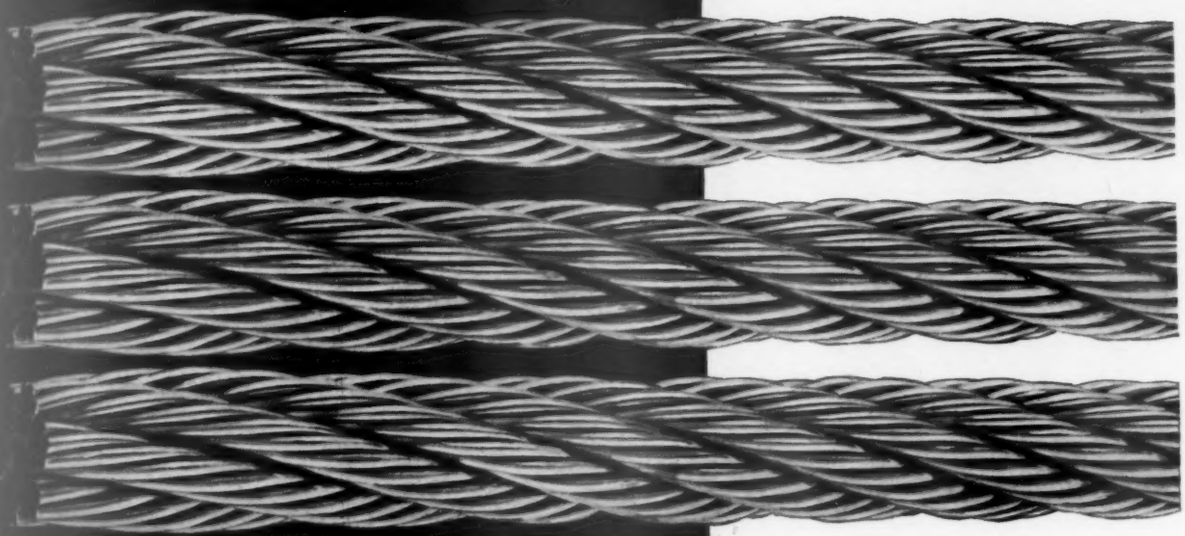
Republic Conveyor Belting

● The inherent advantages which the belt conveyor has brought to modern industry—faster production and lower costs—are further enhanced when the belt itself has the capacities of Republic Conveyor Belting for long, constant service, uninterrupted by troublesome delays. There is a Republic Belt built to provide this type of performance in all fields of materials handling . . . carrying anything from wheat to rocks. Rubber compounds and duck of highest attainable quality, with a design mechanically balanced for the particular service, make the best belt for the job. Operating costs are reduced to a minimum by the increased belt life which results. All Republic Conveyor and Elevator Belts are permanently protected against mildew by the exclusive Provar Process. Your Republic Distributor is a reliable source of information on all Republic Belting. REPUBLIC RUBBER DIVISION OF LEE RUBBER & TIRE CORPORATION, YOUNGSTOWN, OHIO.

REPUBLIC RUBBER

HOSE • BELTING
PACKING
MOLDED GOODS

Exactly alike?



Not a bit of it...

TELFAX TELLS YOU WHY

Because wire ropes of the same size all look alike, examination tells you nothing about their grade. In fact, in the case of ordinary ropes, it takes a laboratory test to tell the difference between, say, Cast Steel and Plow Steel—although there is a difference, in the 3/4-in. size, of 36 per cent in list price and nearly four tons in strength.

But Bethlehem Wire Ropes are easy to identify, and without laboratory tests. The exclusive Telfax Tape is built into each foot of Bethlehem Rope. Laid next to the core, this continuous marker is your certificate for instant identification of the grade and quality of every new Bethlehem Rope.

Telfax is a positive protection against mistakes that may lead to damage, or even loss of life. It makes no difference whether the rope has been re-reeled, whether it comes to you in cut lengths, or whether tags and markings have been lost. The identification, built in when the rope was made, is still with the rope: you can quickly and easily check up on the grade. Play safe with Telfax.

This cellophane marker identifies the grade of all Bethlehem wire rope. The name is printed on it, and color gives further identification: purple = Purple Strand; green = Plow Steel; red = Cast Steel, etc.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

a NEW LOADER

with New Portability

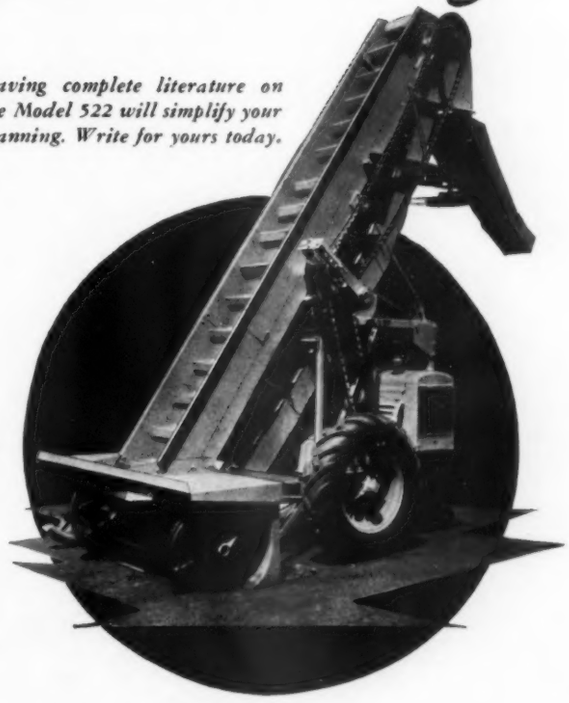
HERE is the New Barber-Greene Model 522, Pneumatic Tired Bucket Loader. It combines all of the many Barber-Greene Bucket Loader Features into a small, compact, low-cost unit that can be quickly hitched to a truck and towed at truck speed.

This new Barber-Greene makes other loading methods too expensive. It has innumerable uses for contractors, maintenance departments, material yards, etc.

The Low Clearance, Swivel Conveyor Discharge Model is ideal wherever low height is needed, or in jobs like the shoulder clean-up operation shown above where the trucks drive straight under and out—no backing up—no delay.

The conventional design shown at the right is the most economical answer for all straight loading jobs. The 522 can be an important factor in reducing your loading costs, and in allowing a more economical material handling system.

Having complete literature on the Model 522 will simplify your planning. Write for yours today.

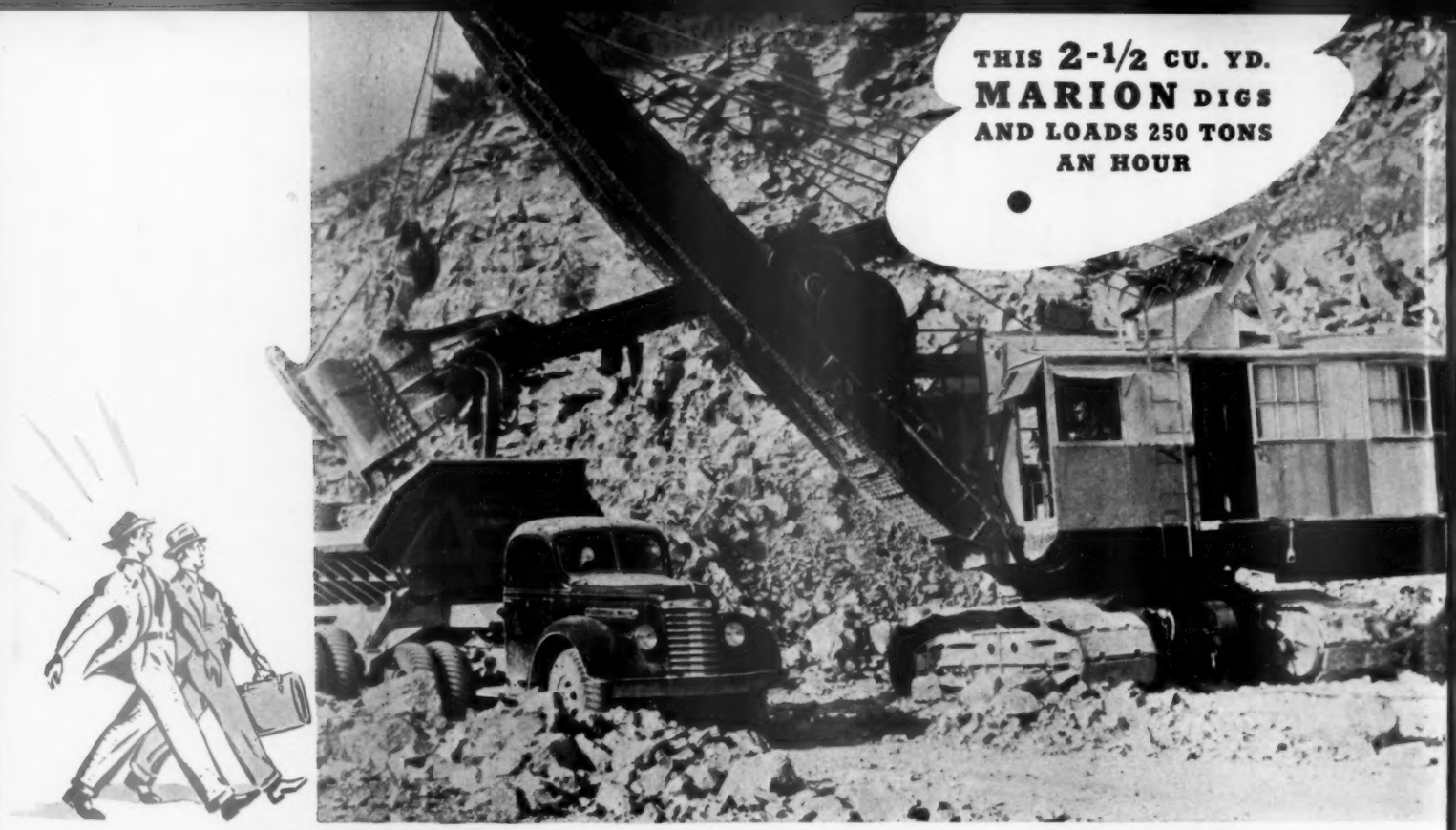


BARBER GREENE

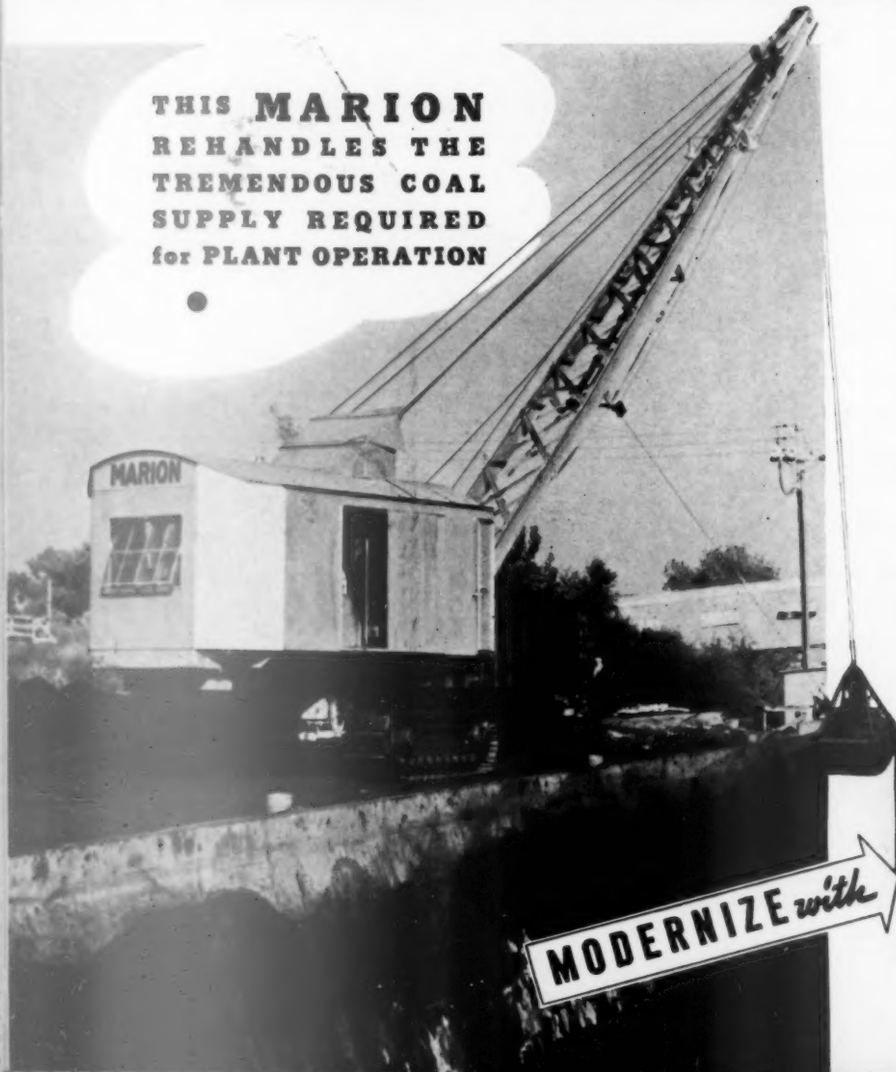
STANDARDIZED MATERIAL HANDLING MACHINES

AURORA ILLINOIS

40-4



IN STEP with the Dewey Portland Cement Co. MODERNIZATION PROGRAM



★ Two Marions assure peak efficiency in the handling of materials at the plant of the Dewey Portland Cement Company, Lindwood, Iowa. One Marion loads stone at the rate of 250 tons an hour; the other Marion quickly unloads and handles the entire coal supply for the plant. The adaptability of Marions to the demands of unusual tasks makes them ideal for solving all excavating and construction problems. Your own material handling jobs can be quicker . . . more economical . . . with a Marion. Our engineers will gladly determine the type you need. Write today.

★ Since this advertisement was prepared, the Dewey Portland Cement Company have purchased **another Marion.**

THE MARION STEAM SHOVEL CO.
MARION, OHIO, U. S. A.

MODERNIZE with

MARION

SHOVELS • DRAGLINES • CLAMSHELLS
CRANES • PULL-SHOVELS • WALKERS

From 3/4 Cubic Yard to 36 Cubic Yards
GASOLINE • DIESEL • ELECTRIC

A JUNIOR — but still big enough!

LET'S LOOK AT THE FACTS

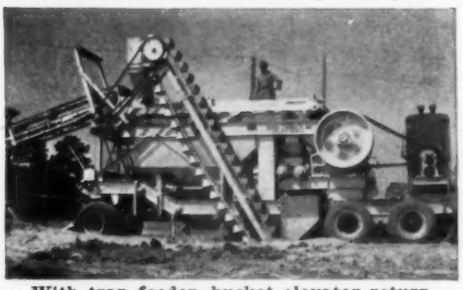
● The average crushing contract today involves small yardages — more pit moves are required to produce these yardages — fast set-up, quick teardown and speedy moves are essential. Nothing but a modern, up-to-date, low operating cost crushing plant will keep you ahead of your competitor. That's why the Junior Tandem Plant meets the crushing trend today. It is small in size but plenty big in profitable operation.

The Junior Tandem is built in various arrangements, some of which are shown at the right. Bulletin JT-1 describes fully all these different types — let us send you a copy.

In addition to the Junior Tandem we offer many combinations of the Super Tandem with 1036 Jaw and 3018 or 4020 Roll Crusher. If you have not seen the new Cedar Rapids all electric two-unit Super, write us for complete details. It is the most modern and efficient portable crushing plant on the market today.

IOWA MANUFACTURING CO.
CEDAR RAPIDS . . IOWA

With shovel loading feeder, bucket elevator return and side delivery conveyor.



With trap feeder, bucket elevator return and side delivery conveyor.

With shovel loading feeder, belt conveyor return and end delivery truck loading conveyor.

CEDAR RAPIDS

PORTABLE and STATIONARY

CRUSHING PLANTS • WASHING PLANTS • ASPHALT MIXING PLANTS • MATERIAL HANDLING EQUIPMENT

"Ay, Mon, She's Braw an' Thr-r-ifty, Too!"

I am at breakfast, when there is a bold step on the porch and a knock at the door. I open it and there is none other than my Scotch friend, Donald MacMurdoch.

"Oliver," he says, stamping his feet, "I've gone and done it!"

"Done what, Donald?"

"Why, mon, I've pur-r-rchased m'sel a new truck," he said with a burr so thick it stuck on his tongue. And not bein' able to resist pullin' his leg a little, I come back at him.

"Are you feelin' all right, Donald," I asks. "You wouldn't be spendin' good money for a new truck when the old one could carry all the laundry in town, would you?'

"But it's a For-r-rd," said Donald, as though that explained everything. "Throw on your sheepskin and take a look."

So I did, and we went outside, with Mamma yellin' at me to button up my coat.

It was a big panel job, painted a fire-engine red, with "Heatherglo Laundry, Donald MacMurdoch, Prop." painted on the side.

"Why didn't you get a red one, Donald?" I ask him.

"It is r-r-red," he answered.

I looked her over from trim front end to rear, and I must admit she is a beauty. I told him so.

"Ay, mon, she's braw an' thr-r-ifty, too," and he looked for all the world like a new father.

"I figur-r-red it oot," he went on. "You canna save money when you're pour-r-ring pr-r-rofits back into repair-r-rs. And you canna get new customer-r-rs with a shabby auld go-cart like the aither truck was. Mon, I'm oot for business, and this truck will tur-r-rn the trick!"

We got inside then and toured around a couple of blocks, and the neighbors that was out all turned to watch us pass.

"Solid comfor-r-rt," said Donald. "And she purr-r-rs like pussy."

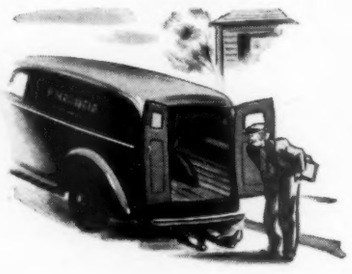
"How many miles to a gallon?" I ask.

"Good enough to suit a Scot," said Donald, "and not a drop of oil has she used!"

We got back to the house, and Donald showed me the door checks, and how they'd put tongue-and-groove planks on the floor to seal it up tight.

"Take a look under-r-rneath, Oliver," Donald said, and bein' a man who is interested in mechanics, I flattened out and scootched under. As clean an underside as ever I saw, with rugged-lookin' driveshaft and springs and a husky axle housin'.

"They know how to build trucks at Ford's, that's one thing sure," I said, crawlin' out.



And then I noticed that my shirt was streaked with dirt, where I'd been on the ground, and Donald sees it, too.

"A shame," he says. And then he gets thoughtful.

"My own fault," I says. "If I'd buttoned my coat like Mamma said, it'd never have happened."

"We-e-el, Oliver," Donald says. "Strip it off and let me take it along. It'll only cost you fifteen cents finished up like new."

"You're right about that truck," I says. "It's gettin' you business already."

"Of cour-r-rse," said Donald. "That fifteen cents is the rate with 10 pounds of rough dry. It ought to be seventeen cents. But seein' thot you're a friend of mine . . . "

Well, what could I do?

Visit the new Ford Expositions at the two Fairs, New York and San Francisco, 1940

FORD V-8 TRUCKS AND COMMERCIAL CARS

Ford Motor Company, Builders of Ford V-8 and Mercury Cars, Ford Trucks, Commercial Cars, Station Wagons, Transit Buses

PIT AND QUARRY

Vol. 32 APRIL, 1940 No. 10

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New Machinery and Supplies 70

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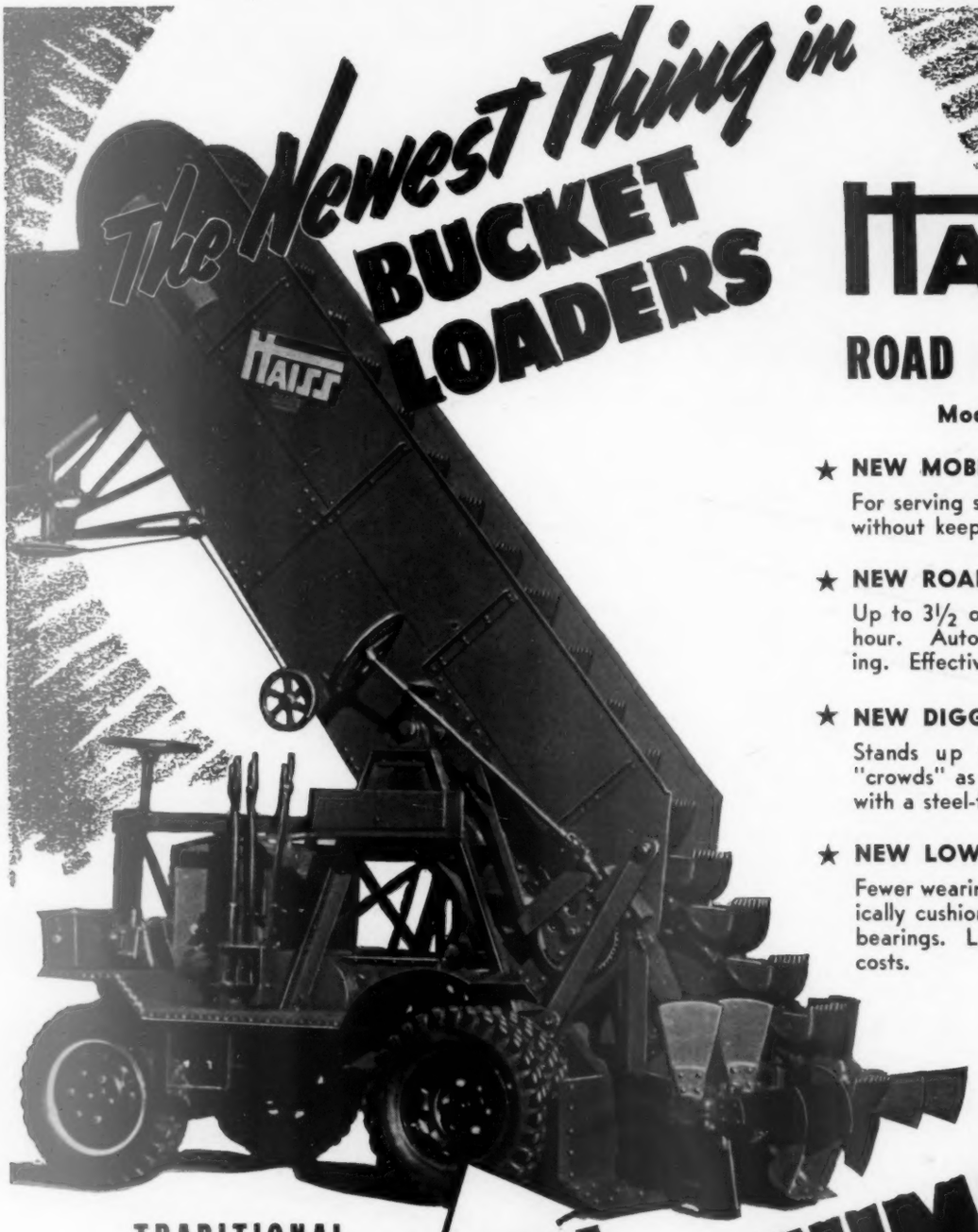

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PIT AND QUARRY

CHICAGO APRIL, 1940

U. S. to Probe Ban on Ready-Mix in Chicago

20 CONCERNS ARE SUBPOENAED

The Federal government on March 11 launched a long-expected investigation on why ready-mixed concrete has never been able to break into Chicago and the Chicago area, as part of its widespread probe of possible violations of the anti-trust laws in the building industry.

Subpoenas were issued calling on 20 concerns to produce documents, letters and telegrams concerning the question. The subpoenas are returnable March 27 and it is expected that the building trades special grand jury will proceed immediately after that date on the evidence gathered. The investigation was launched by Leo F. Tierney, special attorney-general, and the subpoenas issued by Federal Judge Charles E. Woodward.

The government is particularly interested, according to its petition, in having correspondence between the firms named and Michael Carrozzo, head of the International Hod Carriers, Building and Construction Laborers of America. In 1938, it was recalled, Carrozzo called a strike on a construction project in which an attempt was made to use ready-mixed concrete. Carrozzo at the time said he called the strike against the system because it would reduce the number of men used on such jobs.

The government petition, 14 pages long, is specific in its demands for communications with and documents relating to "demands, threats of strikes and strikes" by Local 150 of the International Union of Operating Engineers and Operators; the Hod Carriers, Teamsters, Chauffeurs, Stablemen and Helpers executive council of Chicago, the Joint Council No. 25 of the International Brotherhood of Teamsters and Locals 731 and 786 of the International Brotherhood of Teamsters.

It also asks specifically for correspondence relating to the restrictions on the use of ready-mixed concrete in the Chicago area and restrictions on its production, sale and delivery.

Communications between the companies subpoenaed and Chicago companies engaged in concrete construction work, or sales or production of ingredients of concrete as well as with a number of other associations are also demanded. Communications sought go back as far as 1928. Companies included in this section of the petition are Construction Aggregates Corporation, Consumers Company of Illinois, and the Material Service Corporation.

The petitions defined the Chicago area that is affected by the situation in the ready-mixed concrete business as the city proper and Cook, Lake, McHenry, De Kalb, Kane, Du Page, Will, Kankakee, Kendall and Grundy counties. In the Calumet steel-producing district, across the state line in Indiana, where the union influence is not felt, a half dozen ready-mixed-concrete companies are doing a flourishing business in East Chicago, Hammond, and Gary.

The petition pointed out that ready-mixed concrete is used regularly in such other metropolitan areas as New York, Atlanta, Baltimore, Birmingham, Boston, Cincinnati, Cleveland, Dallas, Denver, Detroit, Kansas City, Los Angeles, Washington, Minneapolis, Montreal, New Orleans, Philadelphia, Pittsburgh, St. Louis, San Francisco and Seattle.

The scope of the new Federal move is by far the most sweeping of any of the other four phases undertaken thus far in the building industry inquiry in Chicago. Previous investigations produced indictments of more than 100 persons and organizations in the tile, plywood, cut stone and electrical businesses.

Announcement has been made of the formation of Basic Industries, Inc., at Wabash, Indiana by James Schultz, Walter Hamilton, Robert Richey and Roy Biberstine.

The concern will produce commercial crushed stone and mineral wool.

New Silicosis Bill in New York Legislature

IMPORTANT FEATURES LISTED

A bill covering new silicosis legislation has been introduced in the New York State Legislature and will probably be enacted into a law. Important features are:

(1) No compensation for partial disability.

(2) Limitation of monetary liability for permanent total disability or death in the amount of $5,000, benefits under the law to be increased at the rate of $50 per month until the maximum of $5,000 is reached in December, 1943.

(3) May allow hospitalization for a period of 90 days, which may be extended on cause shown, for a period not to exceed 360 days, provided the Medical Board recommends such hospitalization.

(4) There is created a Medical Board of three members, who are required to examine the claimant in controverted cases and file their report with the Compensation Bureau, such report to be deemed presumptive evidence in the case.

Plan Third Rotary Kiln at Permanente Plant

The new cement plant of the Permanente Corporation at Los Altos, California, built late last year primarily to supply cement for the construction of Shasta Dam, is now operating at the rate of about 7,000 barrels daily. The installation of a third kiln is said to be planned.

The Ready Mixed Concrete Company of Honolulu has placed an order with the corporation for 500,000 barrels of cement to be shipped to Honolulu.

General offices of the Gager Lime Manufacturing Company have been moved from Chattanooga to Sherwood, Tennessee, where the plant is located.

Sand-Lime Men Form New Concrete Group

FAVOR HIGH-PRESSURE CURING

Chester A. Perkins, head of the Northern Indiana Brick Company, Mishawaka, Indiana, was elected president of the Sand-Lime Brick Association at its annual convention held February 12 and 13 in New York. The vice-president and secretary-treasurer, W. A. Smythe of Toronto and J. Morley Zander of Saginaw, Michigan, respectively, were again re-elected.

Members, after the convention adjourned, announced the formation of a separate and distinct national organization to include in its membership concrete-products manufacturers who cure their output exclusively with high-pressure steam. The name of the organization will be announced later. Members must conform to a strict specification which will necessitate the production of "only genuine high-pressure-steam-cured units." Harold J. Levine, who heads the National Brick Company of Long Island City, is president of the new organization, Mr. Zander serving as its secretary-treasurer.

Minimum Gravel Price at L. A. Set at 25 C.

With a minimum f. o. b. price of 25 cents per ton, Superior Judge Emmet H. Wilson of Los Angeles has established a temporary price scale under which 542 sand-and-gravel operators of Los Angeles County must operate.

The list was set by the court in a preliminary injunction demanded by the Institute of Rock and Sand Producers, a trade association, to prevent sale of materials below cost. Dealers were accused of violating the unfair practices act.

Judge Wilson fixed the minimum "retail price" at 30 cents per ton.

Gypsum Sales Higher in First Two Months

January, 1940, sales of the United States Gypsum Company were 10.9 per cent. larger than the volume for January, 1939, and February sales were up 18.7 per cent., Sewell L. Avery, chairman of the board, told stockholders at the annual meeting held March 6. He said the sales department expect this year's building volume to exceed that of last year by 10 per cent. January net profit was $247,151, against $241,547 in the 1939 month.

Mr. Avery reported that sales in 1939 totaled $44,126,000, an increase of 6.1 per cent. over the $35,712,000 in 1938. This is the first time the company's sales have been reported.

RECENT GOVERNMENT CONTRACTS FOR MATERIALS UNDER THE PUBLIC CONTRACTS (WALSH-HEALEY) ACT

Date of Delivery 1940	Supplier	Government Agency	Commodity	Amount[1]
6/30	Warner Co., Bellefonte, Pa.	Agric. PS&T.	Pulverized limestone	Indefinite
10/31	B. C. Curry, Dandridge, Tenn.	Agric. PS&T.	Agricul. limestone	Indefinite
	Universal Exploration Co., Jefferson City, Tenn.			
10/31	John Evans, Pikeville, Tenn.	Agric. PS&T.	Liming material	Indefinite
10/31	W. C. Jackson, Ashland City, Tenn.	Agric. PS&T.	Agricul. limestone	Indefinite
10/31	Jim Stammers, Lewisburg, Tenn.	Agric. PS&T.	Ground limestone	Indefinite
10/31	General Insulating & Mfg. Co., Alexandria, Ind.	Procurement	Insulating material	Indefinite
Indef.	Monolith Portland Cement Co., Los Angeles, Calif.	Procurement	Portland cement	Indefinite
4/16	Colonial Sand & Stone Co., Inc., New York City	W. P. A.	Sand, stone, grit	$10,248.00
3/23	Rohl-Connolly Co., Los Angeles, Calif.	War, Engineer Corps	Jetty stone	11,250.00
1/6	Marquette Cement Mfg. Co., Chicago, Ill.	War, Engineer Corps	Portland cement	30,750.00
10/31	Southern States Lime Corp., Crab Orchard, Tenn.	Agric. PS&T.	Pulverized limestone	Indefinite
6/30	Leon A. Larrow, East Charlotte, Vt.	Agric. PS&T.	Ground limestone	Indefinite
Indef.	American Agricultural Chemical Co., New York City	T. V. A.	Rock phosphate	$29,700.00
2/15	Monolith Portland Cement Co., Los Angeles, Calif.	W. P. A.	Portland cement	16,780.00
6/30	L. & M. Stone Co., Utica, N. Y.	Agric. PS&T.	Agricul. lime	Indefinite
6/30	Worlock Stone Co., Canastota, N.Y.	Agric. PS&T.	Agricul. lime	Indefinite
Indef.	Huron Portland Cement Co., Cleveland, O.	W. P. A.	Portland cement	$15,752.00
Indef.	Southern Materials Corp., Norfolk, Va.	Naval Supply Depot	Ready-mixed-concrete	14,740.00
6/30	Claude Gleasman, West Leyden, N. Y.	Agric. PS&T.	Pulverized limestone	Indefinite
6/30	Pekin Stone Products Corp., Lockport, N. Y.	Agric. PS&T.	Limestone meal	Indefinite
6/30	American Limestone Quarry Corp., Wingdale, N. Y.	Agric. PS&T.	Ground limestone	Indefinite
6/30	Farber White Limestone Co., McAfee, N. J.	Agric. PS&T.	Pulverized limestone	Indefinite
6/30	Gailor Stone Co., Inc., Saratoga Springs, N. Y.	Agric. PS&T.	Ground limestone	Indefinite
6/30	William Anderson, Accord, N. Y.	Agric. PS&T.	Pulverized limestone	Indefinite
6/30	Vermarco Lime Co., West Rutland, Vt.	Agric. PS&T.	Ground limestone	Indefinite
6/30	Michigan Limestone & Chemical Co., Buffalo, N. Y.	Agric. PS&T.	Pulverized limestone	Indefinite
6/30	Ohio Hydrate & Supply Co., Woodville, O.	Agric. PS&T.	Pulverized limestone	Indefinite
6/30	National Mortar & Supply Co., Pittsburgh, Pa.	Agric. PS&T.	Pulverized limestone	Indefinite
6/30	Cobleskill Limestone Products Corp., Cobleskill, N. Y.	Agric. PS&T.	Ground limestone	Indefinite
6/30	Racer Lime & Fuel Corp., Catskill, N. Y.	Agric. PS&T.	Pulverized limestone	Indefinite
6/30	William Hyzer & Sons, Franklin, N. Y.	Agric. PS&T.	Pulverized limestone	Indefinite
6/30	Eastern Rock Products, Inc., Oriskany Falls, N. Y.	Agric. PS&T.	Pulverized limestone	Indefinite
6/30	Solvay Sales Corp., Syracuse, N. Y.	Agric. PS&T.	Ground limestone	Indefinite
6/30	Chenango Valley Mills, Inc., Greene, N. Y.	Agric. PS&T.	Pulverized limestone	Indefinite
6/30	Grangers Mfg. Co., Boston, Mass.	Agric. PS&T.	Ground limestone	Indefinite
6/30	Hoosac Valley Lime Co., Inc., Adams, Mass.	Agric. PS&T.	Ground limestone	Indefinite
6/30	Limestone Products Corp. of America, Newton, N. J.	Agric. PS&T.	Pulverized limestone	Indefinite
10/31	James River Hydrate & Supply Co., Inc., Indian Rock, Va.	Agric. PS&T.	Pulverized limestone	Indefinite
10/31	Bloomingdale Lime Corp., Kingsport, Tenn.	Agric. PS&T.	Pulverized lime	Indefinite
10/31	Bertha Mineral Co., Austinville, Va.	Agric. PS&T.	Ground limestone	Indefinite
10/31	Mundy Lime & Stone Co., Harrisonburg, Va.	Agric. PS&T.	Ground limestone	Indefinite
10/31	Page Coöp. Lime Ass'n, Inc., Luray, Va.	Agric. PS&T.	Ground limestone	Indefinite
10/31	Riverton Lime & Stone Co., Inc., Riverton, Va.	Agric. PS&T.	Ground limestone	Indefinite
10/31	Rockydale Quarries Corp., Roanoke, Va.	Agric. PS&T.	Pulverized dolomite	Indefinite
10/31	Toms Brook Lime & Stone Co., Inc., Toms Brook, Va.	Agric. PS&T.	Ground limestone	Indefinite
10/31	Williams & Copenhaver Lime Co., Newport, Va.	Agric. PS&T.	Ground limestone	Indefinite
6/30	Marl Lake Co., Yorkshire, N. Y.	Agric. PS&T.	Natural marl	Indefinite
6/30	H. G. Fenton Material Co., San Diego, Calif.	Naval Supply Depot	Sand, crushed rock	$17,865.00
Indef.	Alabama Asphaltic Limestone Co., Birmingham, Ala.	W. P. A.	Asphaltic rock	11,391.80
8/1	Monolith Portland Cement Co., Los Angeles, Calif.	War, Engineer Corps	Portland cement	49,600.00
6/30	Northern Quarries, Inc., Norwood, N. Y.	Agric. PS&T.	Agricultural lime	Indefinite

[1] "Indefinite" refers to indefinite contract; purchases to be made as and when needed.

Myers Heads Batesville White Lime Company

At an annual meeting of stockholders, Louis R. Myers, Little Rock investment banker, was elected president of the Batesville White Lime Company of Batesville, Arkansas.

Other officers are: Lee McCourt (Memphis), vice-president; Ray Case, secretary; Lee V. Bates, treasurer, and Lawrence Smith, general manager.

W. W. Fischer of Memphis was elected chairman of the board of directors.

E. T. Nettleton to Direct Suzio Firms' Operations

E. T. Nettleton, until recently secretary and engineering director of the New York State Crushed Stone Association, has been named general superintendent and engineer of the L. Suzio Construction Company, the York Hill Trap Rock Quarry Company, the L. Suzio Trap Rock Company and The Suzio Trap Rock Company, all of Meriden, Connecticut. He has had wide experience in the highway and aggregates fields, including 14 years as engineer and sales manager of the New Haven Trap Rock Company, New Haven, Connecticut. He recently contributed to PIT AND QUARRY an article discussing local trade associations.

Indiana Association Holds 1940 Meeting

NAME C. H. PURDUM PRESIDENT

The sixth annual convention of the Indiana Mineral Aggregates Association was held in Indianapolis on March 7. The following officers were elected for one-year terms: President, C. H. Purdum (sand and gravel), Sturm & Dillard Company, Syracuse; vice-president, George H. Balfe (crushed stone), Monon Crushed Stone Company, Monon; vice-president, Edward F. Healey (slag), France Stone Company, South Bend; secretary-treasurer, L. F. Hart, Wabash Sand & Gravel Company, Terre Haute.

The following directors were elected for two-year terms: W. C. Babcock, W. C. Babcock Grain Company, Rensselaer, to represent the crushed-stone industry in the first district; M. A. Neville, Western Indiana Gravel Company, Lafayette, to represent the sand-and-gravel industry in the third district; C. M. Herriman, Mid-West Rock Products Corporation, Indianapolis, to represent the crushed-stone industry in the third district; C. Gray, American Aggregates Corporation, Indianapolis, to represent the sand-and-gravel industry in the fourth district; N. E. Kelb, Ohio & Indiana Stone Company, Indianapolis, to represent the crushed-stone industry in the fourth district; Bert Koenig, Koch Sand & Gravel Company, Evansville, to represent the sand-and-gravel industry in the fifth district; and, R. W. Meisinger, Hy-Rock Products Company, Marengo, to represent the crushed-stone industry in the fifth district. Three directors elected for two-year terms in 1939 each have another year to serve. These directors are: Ray J. Kiley, Consumers Company, Chicago; C. C. Deal, Brand & Deal, Elkhart; and Harry Meshberger, Meshberger Brothers Stone Corporation, Linn Grove.

Sam C. Hadden, executive secretary, in his annual address reviewed some of the developments in Indiana during the past year, particularly from a legislative point of view. He also told of the efforts made by the association in opposing further diversion of highway funds, or increasing gasoline taxes.

Lime-Putty Operators Exchange Experiences

Stanley Smith of the Concrete Construction & Supply Company of Columbia, South Carolina, was elected president and Herbert Jahncke of Jahncke Service Inc., New Orleans, was elected secretary-treasurer of the Lime Putty Plant Operators' Association at its 1940 annual meeting in Washington, D. C., on March 1. They succeed Irving Warner of the Warner Company, Philadelphia, and Hayden Brooks, Standard Building Material Company, Birmingham, who have served the organization as president and secretary, respectively, since it was founded in 1937.

The meeting was well attended, representatives from ten of the twelve Brooks-Taylor lime-putty plants in the United States being present. There also were a number of guests.

The meetings, held in the Ambassador Hotel, consisted of round-table discussions with members exchanging experiences on operating and marketing problems. Immediately after the afternoon session the group visited the Super Concrete Corporation plant where a standard three-tank plant has been in operation for several years. There a demonstration was put on by the Warner Company showing how a device developed by Professor Voss of Massachusetts Institute of Technology can be used to determine the carrying capacity of various mortars.

EMPLOYMENT AND PAY-ROLLS

(Compiled for PIT AND QUARRY by Isador Lubin, Commissioner of Labor Statistics, U. S. Dept. of Labor.)

Industry	Establishments	Number of Employees	Pay Rolls (1 week)
Cement:			
December, 1939	131	19,428	$528,464
January, 1940	131	16,893	421,609
Percentage change		—13.0	—20.2
Quarrying and non-metallic mining:			
December, 1939	1,019	33,340	725,821
January, 1940	1,019	28,603	548,931
Percentage change		—14.2	—24.4

Coming Events

May 7-9, 1940—Cincinnati, O. Annual convention, National Concrete Burial Vault Association, Netherland-Plaza Hotel.

May 21, 22, 23, 1940—Chicago, Ill. Twenty-second annual convention, National Lime Association, Drake Hotel.

June 13, 14, 1940—White Sulphur Springs, W. Va. Fifth annual convention, National Industrial Sand Association, Greenbriar Hotel.

National Lime Plant Sold to Marble Cliff

TO INSTALL VERTICAL KILNS

The Marble Cliff Quarries Company, with headquarters at Columbus, Ohio, and large lime and limestone operations at Marble Cliff, Ohio, a suburb of Columbus, recently purchased the property of the National Lime & Stone Company near Lewisburg, Ohio. During recent years, the Lewisburg quarry has been operated as a source of highway and commercial stone, but it is the intention of the new owners to interest themselves in the production of high-calcium lime made from the rock taken from the lower strata of the Lewisburg deposit. The upper and overlaying strata of the Lewisburg stone are unsuited for lime and chemical purposes, so it will be necessary to resort to mining to secure a satisfactory grade of limestone.

The lime plant at Marble Cliff is of the rotary-kiln type, whereas the installation proposed for Lewisburg will be vertical kilns thereby giving Marble Cliff two types of burned lime for its trade. Present plans call for two vertical kilns of the large capacity type.

Victor J. Azbe of St. Louis has been named as consulting engineer for the new plant, while R. H. Pausch, secretary and R. W. Bowen, production manager, of the Marble Cliff Quarries Company, are in immediate charge of the installation.

Floods Damage Shasta Dam Aggregate Plant

The recent floods in California did considerable damage to the new aggregates plant of the Columbia Construction Company at Redding. The plant, which will supply aggregates for Shasta Dam, making deliveries over a 9.6-mile belt-conveying system, is now being repaired.

All raw-material conveyors from pit to plant were either washed out of place or washed entirely away. The primary-crusher housing was displaced, air copressors and several transformers were inundated, and a number of conveyor structures were carried away by the raging waters.

Monolith Cement Plans to Add Another Kiln

The Monolith Portland Cement Company is planning to add another rotary kiln at its plant near Monolith, California, increasing the annual output by about 1,000,000 barrels, Coy Burnett, president, told stockholders at the annual meeting held recently.

Private Building Up; Public Work Declines

NON-RESIDENTIAL AWARDS GAIN

Contracts awarded in the 37 eastern states for non-residential building for private ownership during February aggregated $43,674,000, according to the F. W. Dodge Corporation. This represented an increase of $16,218,000, or 59 per cent over February of last year and was more than enough to offset the decline, $15,197,000, registered by public non-residential projects, a reduction caused mainly by the marked reduction in the public school program.

While the valuation of contracts awarded in February for total residential building was about 5 per cent. lower than last year, it is of considerable importance that one- and two-family houses, both for owner's occupancy and for sale or rent, not only exceeded the corresponding month 1939 but also showed improvement over the preceding month, January, 1940.

The composite of total value of contracts awarded in February, for buildings, utilities and public works for private ownership, is up 9 per cent. over the corresponding month last year and is up 15 per cent. over January, 1940, while total construction for public ownership in the month is down from both periods. The net result is that total construction contracts awarded for both private and public ownership amounted to $200,574,000 in February, 1940 as compared with $220,197,000 in February of last year and $196,191,000 in January of this year.

Newark Plaster Company Celebrates Centennial

The centennial anniversary of the Newark Plaster Company, Newark, New Jersey, was celebrated March 1. The business was founded by Calvin Tomkins in 1818, but was not chartered by the New Jersey legislature until 1840. At that time its name was the Newark Cement & Lime Manufacturing Company.

In 1825 steam power was used for the first time in a Newark factory when Seth Boyden built a steam engine for the company. The original company engaged in the manufacture and distribution of plaster, cement, brick, lime, crushed stone and other building materials.

Since the beginning of this century its principal activities have been the manufacture of gypsum products. Some of the original buildings are in use and new ones have been added. The company acquired a plant at Delawana in 1937. The management of the company, whose name was changed at the beginning of this century, has been in the hands of descendants of the founder since its inception.

N. Y. Stone Men Meet; Hayes Made Director

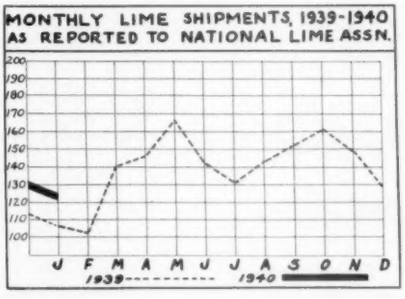
Officers elected at the recent annual meeting of the New York State Crushed Stone Association include: H. E. Coleman, president; E. K. Webster, vice-president; Harry E. Battin, treasurer.

Announcement was made at the meeting of the appointment of Harry R. Hayes of Albany as engineering-director and secretary of the association, succeeding E. T. Nettleton. Mr. Hayes served as manager of the New York State Contractors' Association for 10 years and has had wide experience in engineering work and legislative contact.

Seasonal Exemption Is Now in Effect

Seasonal exemption for the northern branch of the sand-and-gravel industry under the Fair Labor Standards Act of 1938 became effective March 15, no petition for review having been filed.

The states and counties affected were listed and shown graphically by a map of the United States on pages 44 and 45 of the February, 1940 issue of PIT AND QUARRY.



According to data collected by the National Lime Association, 74 companies in January, 1940 shipped 121,901 tons (86,573 quicklime; 35,328 hydrate). Reporting companies represent 52.6 per cent. of the association's total capacity of record. Based on PIT AND QUARRY's estimates for the remainder of the industry the total shipments for the month are estimated to have been approximately 230,000 tons. Shipments of lime by use and grade for January, 1940 were as follows:

Use	Quicklime (tons)	Hydrate (tons)
Agricultural	503	2,509
Building	14,365	16,379
Chemical	71,705	16,440
Total	86,573	35,328

A.S.T.M. May Discard Deval Abrasion Test

L. A. RATTLER METHOD FAVORED

The decision to refer to letter ballot of the committee two proposed new tentative specifications for materials for stabilized base course and for stabilized surface course was an important action taken by Committee D-4 on Road and Paving Materials at its meeting during A.S.T.M. Committee Week in Detroit, March 4 to 8. In addition there will be recommendations to the Society on a number of the other specifications in the charge of this group.

The scope of the proposed new specifications is as follows: "These specifications cover the quality and size of sand-clay mixtures; gravel, stone or slag screenings, or sand, crusher run coarse aggregate consisting of gravel, crushed stone or slag combined with soil mortar or any combination of these materials for use in the construction of a stabilized base course (or stabilized surface course). The requirements are intended to cover only materials having normal or average specific gravity, absorption and gradation characteristics. Where materials such as caliche, gypsum, limerock, and water soluble salts are to be used appropriate limits suitable to their use must be specified. Three types of base (or surface) stabilized mixtures are specified; namely, sand-clay mortar; coarse graded aggregate; and gravel, stone or slag screenings or sand.

The growing use of the Los Angeles rattler in determining abrasion of aggregate led the committee to consider the possibility of eliminating the abrasion test using the Deval machine. In addition to changes in the specifications for crushed stone for waterbound base and surface courses (D 489-38 T) the committee is also developing revisions in several of its other specifications.

End Test Run at New Arkansas Lime Plant

Test runs have been completed at the new rotary-kiln lime plant operated by the St. Clair Lime & Material Company near Guion, Arkansas.

The kiln, 110 feet long and 6 feet in diameter, is fired with oil and has a capacity of 75 tons per 24-hour day.

The Inkley Marble Quarries have been reorganized and are now known as the Inkley Marble Quarries of Saint Genevieve, Missouri. Thomas Inkley is president and Edward H. Love, Jr., vice-president. Herman F. Weiler is superintendent of the quarry and plant.

The concern produces dimension marble and aggregates.

Reveal Huge Material Purchases by W.P.A.

EXCEED ONE BILLION DOLLARS

All the cement bought by the Work Projects Administration and its local project sponsors from July, 1935 through September, 1939 would fill 241,000 freight cars, would represent 4,800 trains of more than 50 cars each.

In the first four years of the WPA a total of $102,000,000 was spent for this essential material used in the government's program to provide employment for the needy on construction projects of permanent value. The WPA itself spent $62,000,000 for cement, while local agencies supplied the additional $40,000,000. Nor was this all; the Federal government and sponsoring agencies spent $55,000,000 for concrete products, of which approximately one-third is estimated to represent cement.

These statistics, just issued by the WPA, show according to estimates of the Bureau of Labor Statistics of the U. S. Department of Labor, that employment was made possible for thousands more than the project workers employed directly. The cement orders enabled the cement and concrete industries to provide more than 278,000 man-months of employment for their own workers, to say nothing of those engaged in the transportation of the materials from plants and factories to project sites.

Cement purchases for WPA projects in the past fiscal year—July 1, 1938 to June 30, 1939—totaled $32,429,000, the sponsors paying some $13,565,000 and the Federal government the remainder. Concrete products for the same period cost $18,384,000, of which the Federal government paid $6,518,000 and the sponsors $11,866,000.

Purchases of crushed stone and sand and gravel for use on Works Projects Administration projects from July 1935 through September 1939 totaled $144,732,000—a supply that would make a pile as big as a 17-story building 225 feet square. In the last fiscal year alone—the 12-month period ended June 30, 1939—the Federal government and local sponsors spent more than $23,000,000 for these materials.

During the four and one-quarter year period since the inception of the WPA program in July 1935, purchases of crushed stone alone amounted to $67,762,000, while orders for sand and gravel for work-relief projects totaled $76,969,000.

This crushed stone and sand and gravel were used on a wide variety of construction projects, including public buildings, highways, roads and streets, recreational facilities, piers, wharves, dams, and any number of similar undertakings.

Since 1935 approximately 7,500,000 persons taken from local relief rolls have been given employment on all WPA projects for varying periods, and currently, some 2,000,000 are earning subsistence wages on the work-relief program. The statistics of project employment, however, do not give the full picture of employment under the WPA program for, the U. S. Bureau of Labor Statistics estimates, orders for crushed stone, sand and gravel for WPA projects accounted for 195,760 man-months of employment in their production, to say nothing of incidental employment required for their transportation from pits and quarries, and from plants, to project sites in nearly all the nation's 3,070 counties. Of this indirect employment, 95,142 man-months of labor were required in the crushed-stone industry to meet WPA orders, while 159,819 man-months were needed to produce the sand and gravel needed for Federal work-relief projects.

All the materials, supplies and equipment purchased for the more than 200,000 projects operated by WPA since 1935 amounted to $1,118,764,000 with resultant private employment estimated by the Bureau of Labor Statistics at more than 2,500,000 man-months.

While the costs of material purchases were shared between the Federal government and the local agencies sponsoring the projects all the purchases were made through the procurement division of the U. S. Treasury Department. The Federal government in four and one-quarter years spent, for all materials, $463,061,000; for crushed stone, $28,919,000; and for sand and gravel, $23,463,000. In the same period sponsors spent for all materials, $655,702,000; for crushed stone $38,843,000; and for sand and gravel $53,506,000.

The Washed Sand & Gravel Company, Salem, Oregon, is adding a crusher at its plant.

No Accidents in 50 Cement Plants in '39

TRACE PROGRESS IN 20 YEARS

Perfect safety records in 1939 were made by approximately 50 cement plants according to A. J. R. Curtis, assistant to the general manager Portland Cement Association. While 52 plants were accident-free in the preceding year, the 1939 record is an improvement since 10 more plants were included in the 1939 studies than in 1938.

Continuous operation of these plants for an entire calendar year without a single lost-time accident entitles each of them to receive the Portland Cement Association safety trophy.

The cement industry was among the first in any industry to develop organized safety education for plant workers. To-day this has been carried to such a point that the industry has annually been awarded the Joseph A. Holmes safety award, the highest safety honor for any of the industries reporting to the United States Bureau of Mines.

Twenty years ago not a single cement mill among the more than 150 represented in the industry could boast of no lost-time accidents for a calendar year. Since then plants in the industry have operated for 493 plant years without a single disabling injury. Accidents in the quarries and mines are continuing at a rate that is regarded as being higher than necessary however. It is felt that the quarries report too great a proportion of all disabling injuries, and that something must be done about it. In all probability this phase of accident-prevention will receive special attention through 1940.

About $50,000 is reported to have been spent this winter in the construction of the lime and crushed-stone plant of the Bluewater Lime Corporation at Grants, New Mexico. Diesel-electric power will be generated at the plant. Offices are at Albuquerque.

One of a fleet of 42 International trucks operated by Graham Brothers, Inc., Los Angeles. Some, including the one pictured here, have been driven over 350,000 miles with few repairs

Use Weekly Basis to Determine Compliance

WAGE-HOUR RULING IS ISSUED

Any employer not covered by a Wage Order, who pays his employees at least $12.60 for a 42-hour workweek, will be considered to be complying with the Fair Labor Standards Act, it has been announced by the Wage and Hour Division, U. S. Department of Labor. For enforcement purposes the Wage and Hour Division is adopting a weekly, rather than an hourly, basis of determining whether an employer has complied with the law.

The principles announced in the opinion are equally applicable to employees in the four industries (millinery, textile, seamless-hosiery and full-fashioned-hosiery) for which Wage Orders have been issued as well as to employees under the 30-cent minimum wage rates now in effect for employees engaged in interstate commerce or in the production of goods for interstate commerce.

The position of the Division is contained in a letter of the General Counsel George A. McNulty, which says in part:

"In our opinion the longest period of time over which earnings may be averaged to determine whether the employer has paid wages at the rate of 30 cents an hour is a work-week and there may be no averaging of wages over two or more work-weeks. Thus, if a piece-worker earns $12.00 at his piece rate for 42 hours work in one week and $14.00 at his piece rate for 42 hours work the following week, the employer has not met the repuirements of the act during the first week, even though the employee earns more than the equivalent of 30 cents an hour for the total hours worked in the two-week period. The employer will be required to pay the employee 60 cents extra ([42 hours x 30 cents]=$12.60; $12.60—$12.00=60 cents) to make up the minimum wage for the first week. This will be true even though the employer pays bi-weekly or at any longer interval. There is no objection, of course, to a bi-weekly, semi-monthly or monthly pay period, but a single work-week is the longest period which may be taken as the standard for the purpose of computing the amount of compensation due the employee at each pay period.

"The next question is whether the work-week will be taken as the standard period of time over which wages may be averaged or whether a period less than a work-week will be taken to determine compliance with Section 6. For enforcement purposes the Wage and Hour Division is at present adopting the work-week as the standard period of time over which wages may be averaged to determine whether the employer has paid the equivalent of 30 cents an hour. In other words, the Division will not consider an employer in violation of the minimum-wage provisions of the law if he pays at least $12.60 for a 42-hour work-week or a sum equivalent to 30 cents an hour for the number of hours worked during the work-week.

"It must be remembered, however, that this opinion is not binding upon the courts and will not protect an employer in a civil suit brought by his employees under the provisions of Section 16 (b) of the act. We feel constrained to point out, therefore, that section 6 of the act requires that every employer shall pay to each of his employees subject to its provisions "not less than 30 cents *an hour*." The courts may thus hold in certain circumstances that an employer has not complied with the law even though the total weekly earnings for a 42-hour week equalled $12.60. The courts may hold, for example, that it is unlawful to set a time (hourly) rate of less than 30 cents an hour for any hours during the work-week even though higher earnings during other hours in the week might bring the total weekly earnings to $12.60 for 42 hours. Another example of a case the courts might hold to be a violation of the law would be where the employer does not pay anything for hours properly considered to be hours worked, such as periods of waiting time. There may be other cases where the courts might take a period less than a work-week as the standard under Section 6, but, as stated above, until directed otherwise by an authoritative ruling of the courts, the Division will take the work-week as the standard for determining whether there has been full compliance with the law.

"It should be noted that the principles set forth herein are equally applicable to a minimum wage rate set by a wage order issued under Section 8 of the act."

A view showing a part of the quarrying operations at the Calcite workings of the Michigan Limestone & Chemical Company, Rogers City, Michigan. The huge Bucyrus-Erie shovel is loading stone into the train of automatic dump cars for delivery to the crushers. Four Sanderson Cyclone drills and a Caterpillar tractor-LeTourneau scraper combination are at work in the foreground.

Old Indiana Lime Plant Taken Out of Service

At the end of the year of 1939, operations at the plant of the Lehigh Lime Company at Mitchell, Indiana, ceased. The concern was organized as the Mitchell Lime Company in the early nineties after the properties were bought from Asa Erwin, one of the pioneer lime men of southern Indiana. The Lehigh Lime Company, a subsidiary of the Lehigh Portland Cement Company, took over the business in 1907 and has operated it since that time.

It is said also that because of increased labor costs during recent years, together with the greater competition from rotary-kiln plants in other localities, the plant has been operating at a net loss.

Up to a few years ago the lime plant had an average of about 85 employes. This number was reduced during the last two years to an average of slightly under 50 men.

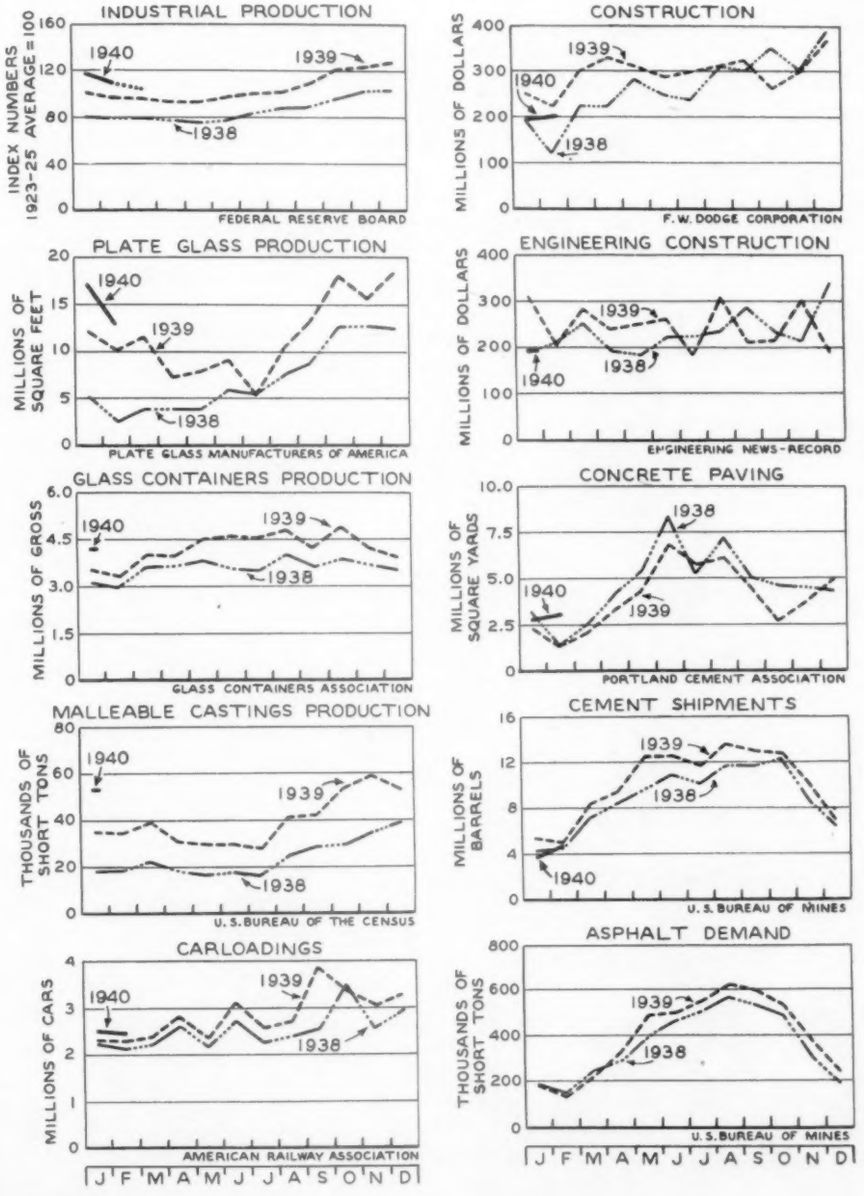
Producers Exhibit at Milwaukee Convention

Among the 166 firms exhibiting at the golden jubilee convention of the Wisconsin Retail Lumbermen's Association, February 13, 14 and 15, in the Milwaukee Auditorium were the Dewey Portland Cement Company, the Marquette Cement Manufacturing Company, Universal Atlas Cement Company, Limestone Products Company of Menominee, Michigan; National Gypsum Company, and the United States Gypsum Company.

CURRENT BUSINESS INDICATORS

The generally optimistic opinion of many economists and business leaders regarding the seriousness of the business slump since the first of the year seems possibly to be justifiable, for the rate of the decline definitely was retarded during March. The drop in February, however, was just as sharp as in the previous month, if measured by the index of industrial activity of the Federal Reserve Board. This index, adjusted for seasonal variation, reached an all-time high of 128 in December, 1939, but dropped 9 points to 119 in January and 10 points to 109 in February. Preliminary evidence indicates a further decline of perhaps 4 or 5 points in March. Business activity represented by this level of the index approaches conditions in August, 1939, the month immediately preceding the outbreak of hostilities in Europe, when the index was 103.

In a press conference earlier this year President Roosevelt cited certain figures regarding national income and national debt that caused widespread comment. Many of the newspaper stories did not include the data that provided the basis for his remarks and it may be of interest to summarize them here. The following figures are from the Annual Report of the Secretary of the Treasury, except those relating to private debt, which are from the Agricultural Adjustment Administration.



NET INTEREST-BEARING PUBLIC AND PRIVATE DEBT

	June 30, 1932	June 30, 1939	Change
	(millions of dollars)		
Public net debt:			
Federal	16,824	32,044	+15,220
State and local	16,017	14,317	—1,700
Total public debt	32,841	46,361	+13,520
Private debt	108,282	92,516	—15,766
Total public and private	141,123	138,877	—2,246

This tabulation has been interpreted to show that broadly the nation as a whole was in a better fiscal position in 1939 than in 1932. Sharp reduction in private debt and a moderate drop in state and local debt more than offset the increase in the Federal debt. Although statistics such as these involving billions of dollars are incomprehensible to most of our American citizenry, the mounting importance of the Federal government in our national economy is strikingly evident. The ultimate result of this trend is a topic of concern to both administration and business leaders but the answer lies in the future.

From the point of view of the Administration an imposing comparison of 1939 with 1932 can be made. The President used the following data to show significant increases in income, employment and pay-rolls, exports, and industrial activity.

	1932	1939	Percentage of Change in 1939
	(thousands of dollars)		
National income [1]	40,089,000	68,500,000	+71
Wages and salaries [1]	2,403,000	3,888,000	+62
Weekly pay-rolls of factory workers [2]	80,384	197,089	+145
Cash farm income: [3]			
From sale of products	4,682,000	7,712,000	+82
From benefit payments	.....	807,000	
Interest received by individuals [1]	5,277,000	4,828,000	—9
Dividends received by individuals [1]	2,745,000	4,253,000	+55
Total non-agricultural employment [2]	27,245	[5] 34,940	+28
Exports [1]	1,611,000	3,179,000	+97
Index of production [4]	64	105	+64

[1] Department of Commerce; wages and salaries are for December.
[2] Department of Labor: December.
[3] Department of Agriculture.
[4] Federal Reserve Board.
[5] Exclude 2,727,000 persons who had work on W.P.A., N.Y.A., and C.C.C. projects.

The layman who is interested in studying the situation is caught between the eloquence of administration leaders quoting statistics such as these and the bitter accusations of businessmen that the policies of the New Deal have thwarted *bona fide* recovery. Let him find solace in the hope that our nation will continue to be involved in political and economic bickering rather than the ravages of war.

EDITORIAL

"Business Needs Friends"

"BUSINESS needs friends," said G. H. Dennison, general manager of the Better Business Bureau of Pittsburgh, addressing the local Rotary Club a few weeks ago. Of course, customers are badly needed, too ,but, Mr. Dennison warns us, "let's not make the mistake of proceeding on the assumption that customers are necessarily friends." Business wants friends, "not ignorant or passive friends," he explains—not, we might add, customers who have been deceived by fraudulent misrepresentation into buying products of low quality or without the ability to perform as claimed. It needs "friends who know how industry serves them," not those who, because they have been the victims of what he calls "the acts of the vicious minority," know how that "minority" has exploited them.

Typical of the apologists who call themselves the "defenders of business," Mr. Dennison has no patience with the authors of such books as *A Hundred Million Guinea Pigs,* which he mentions as the "first anti-business, anti-advertising book"—"first," he tells us, because of its "tremendous popularity" and its "immediate acceptance by consumers." The popularity of this and similar works is not due to any innate "greed," "malice," or "envy," which, he says, "may have been evilly implanted in the human race," but to their unemotional presentation of facts that are of interest and importance to all consumers. The "immediate acceptance" of such books by consumers should not astonish Mr. Dennison any more than their one-time "immediate acceptance" of the advertising claims of his "vicious minority." He brands works of this type as "guilty . . . of much greater misrepresentation than the very business they accuse," yet, as far as we are aware, none of their authors have been summoned to court to answer charges of falsehood, misrepresentation or libel.

In one important respect Mr. Dennison is not typical of the apologists for modern business methods. He has a plan for attaining public good-will—a plan of three parts, one of which is sound, the other two of which are impractical. He suggests, first, that consumer confidence be won "by our ethical advertising conduct." Doubtless he would accept an amendment which would include "ethical selling methods," since advertising is but a function of selling. And, as an indication of what he means by "ethical," he quotes the Fair Practice Code, promulgated by the Better Business Bureau, a statement of principle of which consumers everywhere can approve. We reprint it here because we deem it sound policy:

"Believing it to be of paramount importance to the economic and social welfare of the American people that practices in business should be more clearly established and firmly maintained on a plane of fairness to the public and fairness to competitors and to business as a whole, Better Business Bureaus propose that business men, themselves, shall abandon and condemn any practices in advertising and selling which may have the capacity or tendency to undermine public confidence in advertising, or the effect of injuring unfairly the sales or the good-will of a competitor's product or service."

This is a good general statement of principle, sufficiently good to lead one to wish that the means of making it widely effective were available. For it is one thing to declare a belief in ethical principles, but quite another to practice them. Business has not yet stumbled on—and we doubt whether there has been any serious search for—a practical method of giving force and effect to such a belief through internal self-discipline by business men themselves. So, such policing as is done in the interest of consumers has been left to the punitive efforts of consumer organizations and governments.

Mr. Dennison's second proposal is "to defend the integrity of business by denouncing irresponsible detractors of business," which seems a rather futile suggestion since the persons whom he calls "detractors" are engaged in exposing the very practices which his Fair Practice Code disapproves and which business men who subscribe to the code are expected to "abandon and condemn." If these practices are to be condemned by "business men themselves," why may not they be condemned by consumers? If the "detractors of business" are false witnesses, they can be effectively disposed of in the courts, whose decisions can be as widely circulated as the statements that may be adjudged untrue.

Lastly, Mr. Dennison proposes "to win consumer friendship by telling them our story." By this he says he means that business "must show the public, by both words and deeds, that its operation contributes to social as well as economic welfare." The deeds, we may say in passing, are more important than the words, even though given only secondary mention. He would have business men tell again the oft-repeated story of "the telegraph, the air-brake, the gasoline engine and countless other great inventions" as evidence of the truth of the claim that no matter how bad the practices of some business men may be, "big business is a good thing for them." He to some extent cheapens his appeal by describing, in utter defiance of historical fact and logical pleading, the "system of private enterprise" as an "American" invention.

Business needs more friends, we agree. They will be won, not by the application of derogatory names to those who, by working in the interests of consumers, are really serving the long-run interests of good business. They will not be won by the showing of motion pictures depicting the "typical" American as the owner of a motor car, his own home, a deskful of bonds and stocks, and insured security for old age. They will not be won by appeals to patriotic fervor.

The route to the consumer's heart lies through his sense of fairness. His good opinion, lost through what Mr. Dennison calls "the dishonesty and the disregard for principle and right conduct" of those business men "who have prostituted the science of advertising for private gain," can not be recovered by the same methods. The remedy, as we see it, lies in the abandonment and condemnation by "business men themselves" of the practices that, even though followed by a "vicious minority," destroyed the good-will of millions of consumers who should be the friends as well as the customers of business.

ELECTRIC HEATING OF BITUMEN RESULTS IN ECONOMY AND FORESTALLS TROUBLE

THE GREAT NOTCH CORPORATION, a subsidiary of the Franklin Contracting Company of Newark, New Jersey, has at its quarry near Great Notch, New Jersey, one of the most interesting combinations of related operations to be found in this country. Originally started for the production of crushed stone only, the main plant now also produces roofing granules. Ready-mixed concrete and bituminized aggregates are produced in a separate building.

The Franklin Contracting Company has an interesting history. It was formed in 1904 to place and promote the use of wood-block paving. In 1919 this company for the first time engaged in the manufacture of paving materials when it built an asphalt plant at Belleville, New Jersey, for the manufacture of sheet asphalt and national asphalt. The latter product was similar to sheet asphalt but contained some clay. In 1930 a second asphalt plant was built at Athenia.

In 1921 the company bought the Harrup & Shannon Quarry at Great Notch and formed the Great Notch Corporation to operate it. In the following year the crushing plant was entirely rebuilt and the two asphalt plants were moved to the quarry property. One of these produces sheet asphalt and other hot mixes and the other produces a patented cold mix. The company also operates two portable asphalt plants.

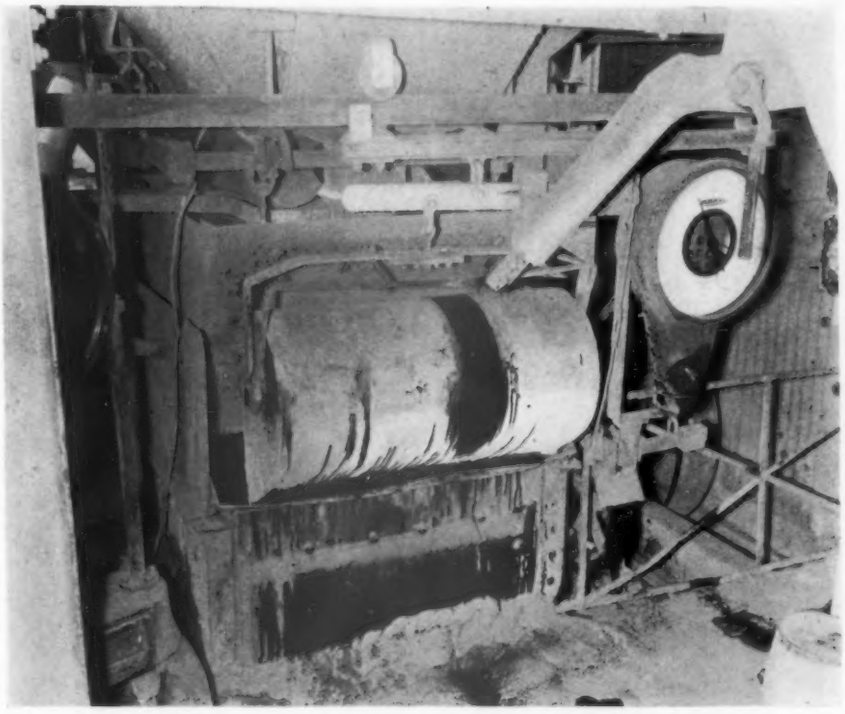
The asphalt plant viewed from the hillside. Conveyor from stone plant at left.

In 1929 a ready-mixed-concrete plant was erected on this property. This plant is operated by the F. E. Schroeder Company for which shipments are made in the trucks of the Great Notch Corporation. Sand for the asphalt and concrete plants is produced from a pit near Pompton Plains, New Jersey, which was taken over in 1930. The production of roofing granules was begun in 1934. The pulverized limestone used in hot mixes is purchased.

In an attempt to improve its asphalt operations studies and experiments were carried on for a number of years under the direction of I. P. Zito, superintendent. Field experiments for the improvement of asphalt pavements were conducted simultaneously under the direction of J. R. Strother, superintendent of construction. In the course of these studies it was found that overheating the asphalt binder results in the loss of its volatile constituents and shortens the life of the asphalt on the road. Underheating was found to result in uneven distribution of the asphalt in the mix. In either case the result is an unsatisfactory pavement. Control of the binder temperature was, therefore, of primary importance.

Formerly each asphalt tank was heated by steam at 100 pounds pressure and the boilers were in continuous use. On cold days and when additional asphalt was put in the tanks sufficient heat was not available, so that uneven temperatures resulted. This affected the pumping, the mixing, and the quality of the finished product. After considerable study the electrification of the entire plant was decided on and was complete in March, 1938.

In this program electric immersion elements and automatic temperature-control equipment were installed in the storage tanks and preheaters. Two 3,000-gallon Easton-Clarmac superheaters were purchased. All this equipment was designed and installed by the Easton Car & Construction Company.



The batcher in the hot plant with asphalt being discharged from bucket into mixer.

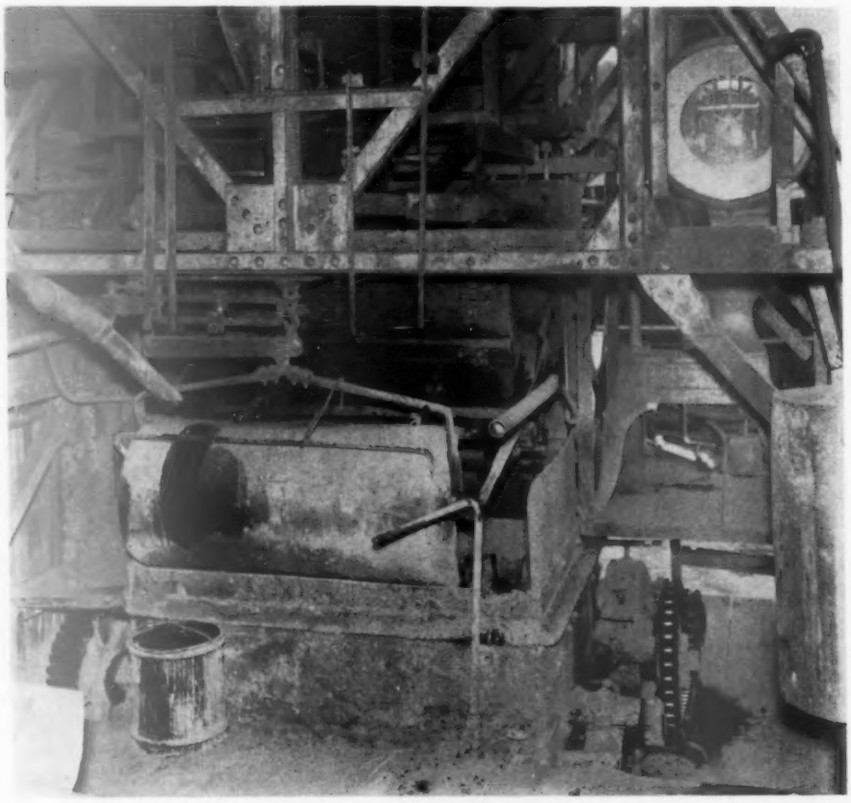
The number and the design of the elements for each tank were determined by the type of material being heated, the capacity and the operating temperatures of the tank, and the rate of heating desired. All the tanks and the superheaters have from 1 to 3 inches of insulation.

The vibrating screen used to size dried aggregates. Limestone filler is dumped from sacks through opening below.

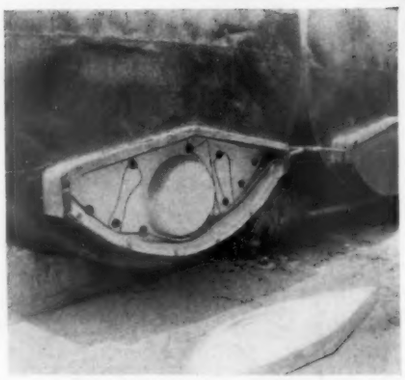
The quarry produces trap rock and this is made into crushed stone and into roofing granules. Stone for the old Cummer hot-mix asphalt plant is carried on a belt-conveyor to one hopper and sand is discharged from railroad cars on a trestle into a second hopper. These materials are dropped through gates to a bucket-elevator feeding a 6-foot by 20-foot oil-fired rotary drier. An elevator feeds the drier product to a 2-deck Allis-Chalmers vibrating screen which is over the fine and coarse aggregate bins.

A 51-60 penetration bitumen is used in the hot-mix plant and this is stored in an 18,000-gallon horizontal cylindrical tank. Electric immersion elements and automatic temperature-control equipment keep the contents of this tank at temperatures from 250 to 275 degrees F. This material is pumped as needed to a 3,000-gallon Easton-Clarmac electric superheater, which heats the bitumen to temperatures between 300 and 325 degrees F. before it is pumped to the asphalt bucket. A circulatory piping system is used so that any bitumen in excess of current needs is returned to the superheater. Because of this constant circulation of hot bitumen it is not necessary to heat the pipe externally. The pipe is well insulated and is drained at the end of a run.

The dump-type asphalt bucket is equipped with a beam scale. Aggregates are discharged through manually-operated gates into weighing batchers with dial scales. The 1,500-pound mixer is kept hot by a small hot-oil circulating system. The finished product is discharged into trucks through an air-operated gate. In addition to sheet asphalt this plant can also produce various types of bituminous concretes with fine or coarse aggregates.



The batchers, scales and mixer in the cold plant.



The electric-heating systems on asphalt-storage tanks. The 85-100 penetration tank is at left.

Stone and sand for the cold-mix and concrete plants are discharged on a second belt-conveyor running to separate bins. From these bins it can be discharged into batchers either for loading concrete truck-mixers or for the 1-ton Iroquois mixer. Whenever, on rare occasions, it is found necessary to dry this material it can be run through the hot-plant drier and mixer into trucks and dumped to an elevator feeding back to the first conveyor.

Drive of the submerged pump on the superheater.

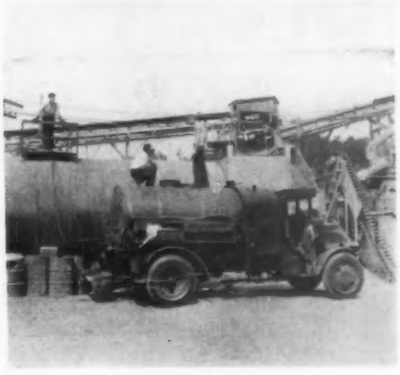
The 8,000-gallon fluxing-oil storage tank for the cold-mix plant is electrically heated to a temperature of 150 degrees F. There is also a 15,000-gallon tank for tars and other asphalts used in distributor-truck penetration work and this is maintained at a temperature of 250 degrees F. The contents of an 18,000-gallon tank, also used for penetration asphalt for distributor-truck loading, is kept at a temperature of 350 degrees F. Fuel-oil for the drier is stored in an 18,000-gallon tank and is maintained at a temperature of 125 degrees F. after preheating in a 1,000-gallon tank.

This plant produces Coldcrete developed by this company. This is a patented mixture of stone and stone sand,

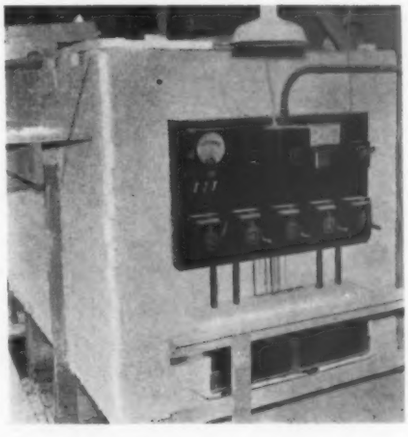
fluxing oil and pulverized hard natural asphalt. It is used locally, chiefly for maintenance work.

All the heating is done during "off-peak" hours when the remainder of the plant is shut down, so that there has been no increase in the "peak" electricity demand. The day plant demand amounts to about 300 kilowatts. The night plant demand and the night heating demand are about 125 kilowatts each. Most of the current required is purchased at an "off-peak" rate from the Public Service Gas & Electric Company.

The operation of this equipment is very simple. The superintendent sets the pointers of the temperature controller at 300 and 325 degrees F., for example. He then switches on enough of the heating elements to insure that the contents of the tank will be brought up into that temperature range by morning. At 8:00 P. M., the start of the "off-peak" period, the night watchman closes a tumbler switch which puts the heating equipment in operation. Before the main plant starts in the morning the switch is opened. Adequate insulation on the tank keeps the temperature from dropping more than 15 degrees F. during the operating day.



Loading bitumen from storage tank into distributing truck.



Additional insulation being put on the superheater. Heating elements below, controls above.

The company has found that the use of electric heating has not only improved its product but that it has also effected a direct saving in heating cost of over $25.00 per day. The $12.00 per day labor cost for steam heating has been eliminated. In September, 1938, a typical month, 42,240 kilowatt-hours of electricity was consumed for heating purposes alone. The volume of bitumen used was 625,000 gallons and the average heating cost per day was $8.75. The heating cost per gallon was .00042 cent.

Left to right: I. P. Zito, asphalt-plant superintendent; "Hap" Manning, highway-department inspector; L. J. Di Miceli, Easton Car & Construction Co.

An additional saving of $50.00 per month was made by the installation of a demand limiter which limits the power demand to 300 kilowatts. This limiter works in conjunction with the demand meter by means of a photo-electric cell. When the needle of the demand meter reaches a predetermined value the cell operates a relay which in turn disconnects the electric heating units in the tanks and some motorized equipment which does not interfere with quarry operations. When the needle of the demand meter returns to zero the demand limiter automatically reëstablishes the circuit to the disconnected equipment.

A further saving was made on the penetration-asphalt operations. When heated by steam the contents of these tanks could be brought up to a temperature of only 290 degrees F., and it was necessary to raise this to the required 350 degrees F. by means of direct oil-fired burners on the distributor trucks. This resulted in much lost time and delays. Under the present system the asphalt is heated electrically, and the delays and expense are eliminated. Fewer trucks are now required to serve a given job and each truck carries more payloads per day.

The company maintains a large fleet of motorized equipment for its varied activities, including 13 asphalt-distributing trucks. A 4,000-gallon tank trailer-truck is used to deliver asphalt to the plant.

This method of receiving asphalt has effected a saving of approximately 50 per cent. of the railroad freight charges for tank-car shipments. Eighteen 10-ton G.M.C. and Mack dump trucks are used for delivering rock, bituminized aggregates, etc. A Mack AC truck, converted to Cummins Diesel power, hauls a low-bed trailer used for moving shovels, etc. The concrete truck-mixer fleet consists of eight 3½-cubic yard Jaeger mixers mounted on Mack trucks, one of which has been converted to Cummins Diesel power.

J. L. Hill is president and C. H. Hallenbeck is vice-president of the Franklin Contracting Company. I. Peter Zito is superintendent of the asphalt plant and D. C. Britt is superintendent of the quarry.

New Phosphate Plant

On January 6, 1940, President Vargas formally inaugurated the first phosphate plant in Brazil, at Ipanema, about 80 miles west of the capital on the Sorocabana Railway. The plant has a 24-hour capacity of 250 tons of mineral with an output of 50 tons of 41-per cent. concentrate, according to Consul R. S. Castleman, stationed at Sao Paulo.

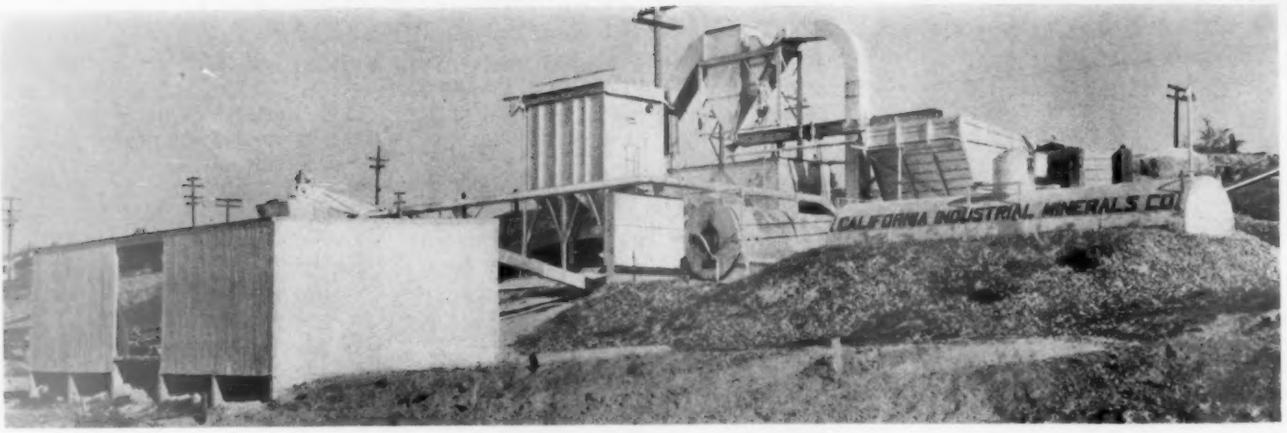
Installs Pit Crusher

In the Los Angeles area there is a sand-and-gravel producer, John D. Gregg, who can always be counted on to do something newsworthy and interesting. His Roscoe, California, plant has been described several times in Pit and Quarry when important improvements have been made. A new system recently installed provides a maximum uniform feed to the plant and eliminates waste time in the pit.

When these operations were last described in the April 1938 issue of Pit and Quarry, a special 25-ton sectional steel hopper made by the Conveyor Company was being used in the pit. Belt-conveyors carried the material to a jaw crusher near the top of the pit. This arrangement was not entirely satisfactory as the bowlders, which form a large percentage of all the gravel in this area, had a tendency to roll down the main inclined conveyor running out of the pit. Wasting these bowlders in the pit meant the loss of considerable good crushed gravel and was impractical for other reasons.

This problem was solved by the installation of a 28- by 36-inch primary jaw crusher in the pit. A pendulum conveyor carries the material from the field hopper mentioned above to this

(Continued on page 44)



A general view of the plant with pack-house at left and fuel-oil storage tank at right.

Compact California Plant Processes Pumicite for Many Industrial Uses

By W. E. TRAUFFER

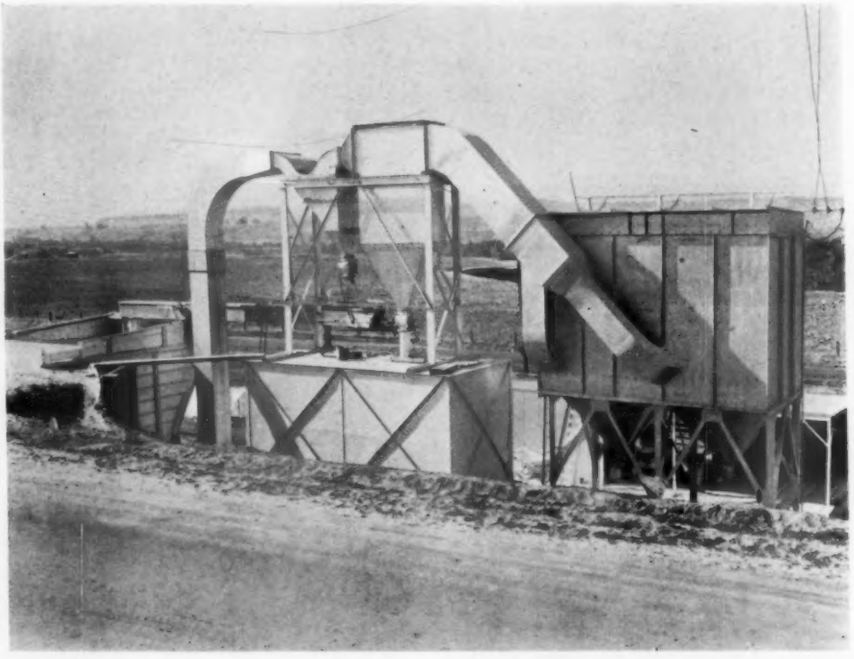
THE production of pumice, and especially pumicite, in the Western states has in recent years experienced somewhat of a revival, although most of the material needed in this country is still imported from Italy. Although its producers were formerly dependent on a few outlets, chiefly those using pumicite as an abrasive for which purpose there is a constant but relatively small demand, new uses have been developed and these promise to multiply the output for this material. One of the oldest uses for pumicite is as an admixture in cement, dating back to Roman days. As a result of the inclusion of pumicite in the specifications for a large dam being built in California, this market also may become more important.

One of the first to use pumicite as an admixture in concrete was the City of Los Angeles, which in 1910 to 1912 used it extensively in the form of ground tuff and Portland-cement mixture on the original Los Angeles Aqueduct. Later the Los Angeles Flood Control District used it to replace 20 per cent. of the cement in two dams built by the district. Several California cement manufacturers have for years been grinding in from 15 to 20 per cent. of pumicite with cement clinker and gypsum to make pozzuolanic cements.

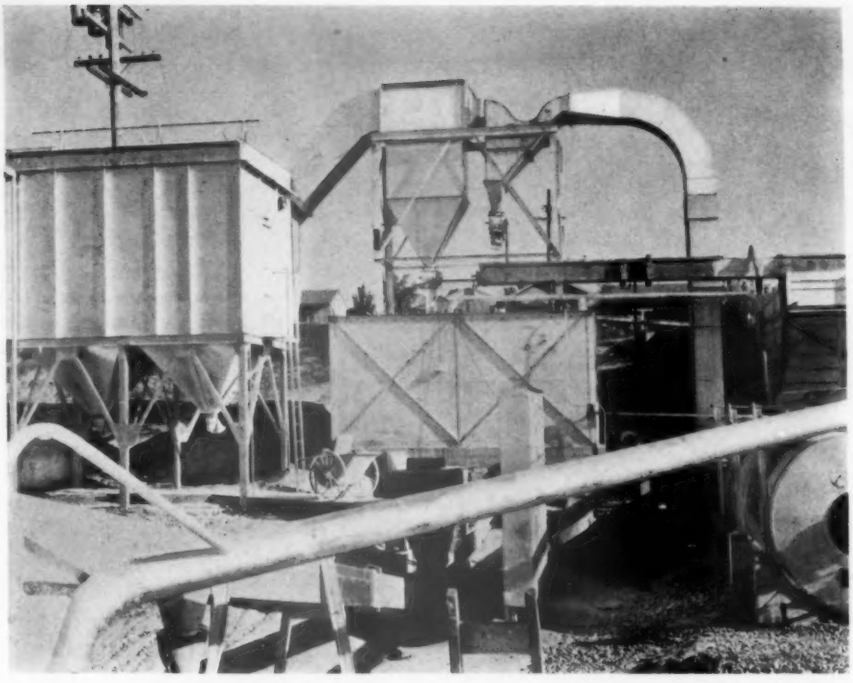
The latest user is the U. S. Bureau of Reclamation, which has specified the use of 20 per cent. of pumicite by weight with the cement to be used in building the Friant Dam of the Central Valley Project. This dam will contain 1,850,000 cubic yards of mass concrete, and about 68,000 tons of pumicite will be required. The specifications require the pumicite to be free-flowing and powdery with a net weight of 40 to 47 pounds per cubic foot. Its specific gravity must be 2.4, and 98 per cent. must pass a 325-mesh sieve.

Some of the better and more accessible of the California deposits are controlled by the California Industrial Minerals Company, which has a new and modern processing plant at Friant, California, 20 miles north of Fresno. This plant, which began operating in the winter of 1938, has a capacity of 40 tons of fine pumicite daily. It was designed by the Western Precipitation Corporation which also supplied most of the equipment. The general manager and engineer of this plant is Forrest S. Taylor, who first came in contact with this project in engineering it and became interested in its commercial possibilities.

The pebble pumice produced is purely a light-weight aggregate having excel-



Another plant view with raw-material hopper at left and bag-type dust-collector at right.



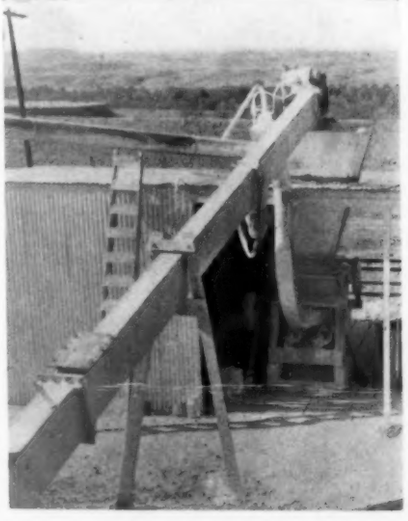
This view from the top of the pack-house shows the compactness of these operations.

lent insulating qualities. It is a cellular volcanic lava-flow material and makes a concrete weighing about 90 pounds per cubic foot. Users of this aggregate include building contractors and concrete-products manufacturers in Oakland, Fresno, Modesto and other cities in that part of the state. It is chiefly used as an abrasive, and as an aggregate because of its light weight and acoustical and insulating properties.

The local pumicite is a finely divided, glass-like volcanic dust which settled in a lake bed and was water-washed before it was deposited. This washing is supposed to be one of the reasons for its pozzuolanic action. The deposits controlled by this company vary in color

The tractor-drawn scraper which loads pumicite through hopper to truck.

from pure white to cream, and in fineness from 75 per cent. through 200-mesh to 99 per cent. through 325-mesh. Milling operations are necessary only for freeing the individual particles from one another, removing excess moisture, eliminating impurites, grading the pumicite particles to the desired sizes, and packing for shipment. Located practically at the site of Friant Dam, the major deposit covers an area of about



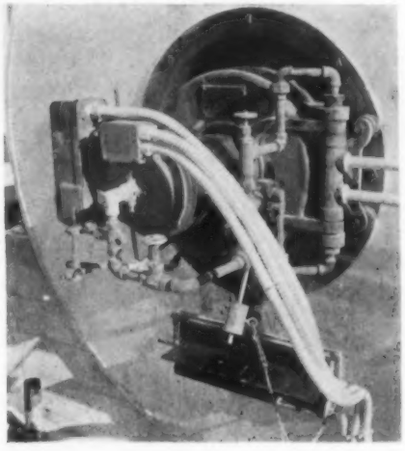
The draw-conveyor which feeds the 2-tube packer. Dust pipe to fan at left.

200 acres in the canyon of the San Joaquin River. It is estimated that 15,000,000 tons can be mined from this deposit by the open-cut process.

The deposit from which most of this material is now being obtained is several miles from the plant. Under a layer of dirt averaging 12 feet in thickness is a 6- to 8-foot bed of weathered pumice which is first removed. Under this is a bed of pebble pumice varying in depth to a maximum of 50 feet. Below the pumice is a bed of pumicite from 12 to 60 feet thick.

The pebble pumice is at present loaded by hand shovels into trucks and is shipped unprocessed to customers.

A 9-cubic foot Sauerman Crescent scraper, operated by a Caterpillar 30 tractor, loads the pumicite into a Reo 4-ton truck which hauls 8 cubic yards of material on each trip to the plant. There the pumicite is discharged over a grizzly into a bin. A paddle conveyor similar to a pug-mill breaks the material as it is fed at a uniform rate into a Western Precipitation Corporation dispersion drier. The drier is essentially a combination disperser-fan-type element, rotating on a central



Close-up view of the oil burner on the drier furnace.

shaft, which provides agitation and air movement in and through the drying zone. The disperser draws in the pumicite along with hot air from a cylindrical furnace connected directly to the drier. The furnace is 6 feet in diameter inside and 15 feet long. It is fired with fuel-oil by a Ray No. 5 oil-burner. The disperser is driven through V-belts by a 40-horsepower motor.

The drier lowers the moisture content of the material from an average of over 20 per cent. to about ½ of 1 per cent. The hot-air temperature fall in

Looking down on paddle-conveyor and its drive and the dispersion drier with furnace connection at left.

the drier from about 1,700 degrees F. to 250 degrees at the entrance to the bag filter is due to the evaporation of this moisture.

The dried pumicite is blown into an impact separator which traps all the plus 100-mesh material and any particles which may have been only partly dried. A screw-conveyor feeds this material back into the truck bin, from which it again goes through the circuit for further breaking and drying.

The material under 100-mesh in size

Forrest S. Taylor, in charge of this operation, with one of the pebble pumice deposits behind.

passes on with the air stream from the separator into a Western Precipitation Corporation Multiclone dust-collector with 9-inch diameter tubes. About 95 per cent. of the entrained solids are removed by this collector and deposited to one of two compartments of a 20-ton steel bin. The other compartment may later be used for the storage of plus 100-mesh pumicite if the demand justifies.

The gas stream from the Multiclone flows on into an American Foundry Equipment Company dust-tube collector. The product collected here is 1- to 6-micron pumicite. Most of this material is around 3 microns in size and there is no material over 6 microns. Because of the small amount of this material it is allowed to build up in the two hoppers under the collector and is withdrawn at intervals into a cart, from which it is discharged into the packer-feed conveyor. A Brown controller, connected at a point beyond the Multiclone, holds the temperature at this point at 250 degrees F. by controlling the fuel-oil feed to the burner.

The Multiclone product is discharged from its bin compartment through a chute to a 40-foot totally-inclosed inclined drag-chain conveyor. From this conveyor the finished material can be discharged direct into trucks but is usually fed to a 2-tube packer. Four-ply paper bags of 100-pound capacity are used.

The entire plant is kept dustless by means of suction lines connected to the packer and its hopper, the screw-conveyors and the two bin compartments. Fuel-oil for the drier is delivered in tank trucks and is stored in an 8,500-gallon tank.

The California Industrial Minerals Company has named its admixture product, which is the same as the material sold to cement manufacturers, Frianite. The average specific surface area of this material is about 4,000 square centimeters per gram. The dust-collector product alone averages 5,670 square centimeters per gram and has an average particle size of 3 microns or about 3/25,000 inch.

Some of the other products made are: Frianite M3x, which has found a ready market in insecticides; Frianite AC3x, an asphalt-filler dust; Frianite S-2, which is used in household cleansers and as a grit in soaps. Some of the extremely fine dust-collector product, Frianite B4x and Frianite S-4, is used for polishing lenses and for other fine work.

The company is at present carrying on a research program to develop the use of pumicite as a filler in rubber tires. The University of California is experimenting with this material in an attempt to find a superior inert carrier for certain insecticide dusts. These experiments have proved quite successful as this material has a pH characteristic of 5.4. The University of Kansas is experimenting with the use of pumicite as a ceramic glaze. A large roofing manufacturer is using an increasing amount of pumicite as a roofing filler as it makes possible a thicker felt.

Gregg *(from page 41)*

crusher, which is mounted on a car straddling the main conveyor. This car rests on rails on each side of the conveyor and can easily be moved to a new position when this conveyor is extended at rare intervals. As before, the Lima 1½-cubic yard electric shovel used for loading moves the sectional field hopper into new positions.

The main conveyor now discharges into a new 800-ton steel surge hopper near the top of the pit. This has sufficient capacity to absorb any ordinary delays in the pit and makes the plant and pit independent of each other. A feeder conveyor driven by a Sterling Speed-Trol variable-speed motor-reducer makes it possible to adjust the rate of feed to the plant's ability to handle the material, which varies considerably in the percentage of sand and of coarse gravel and bowlders. This feeder is controlled from the plant.

Before this system was installed the plant was able to produce only from 200 to 250 tons per hour due to the wide variation in the gradation of the material coming from the pit. The reduction crushers have a combined capacity of about 150 tons per hour and only about 200 tons of sand and small gravel can be processed hourly. As a result any temporary excess of either fine or coarse material made it necessary to slow down the feed to the plant. Now if the material from the pit runs high in fines, as it does when the bank breaks down, the feeder can adjust the rate of feed to the sand-processing capacity. The digging in the pit soon gets to the coarse material and the grades average up in the surge hopper. Production now often reaches 350 tons per hour.

This composite picture shows all the John D. Gregg operations from the pit to stock-piles. The crusher is shown in the pit and the surge hopper is in the left foreground.

Eighteen tons of dynamite go into action at Dewey Portland Cement Company's quarry, and bring down an estimated 125,000 tons of stone to be used in cement manufacture and for commercial aggregates.

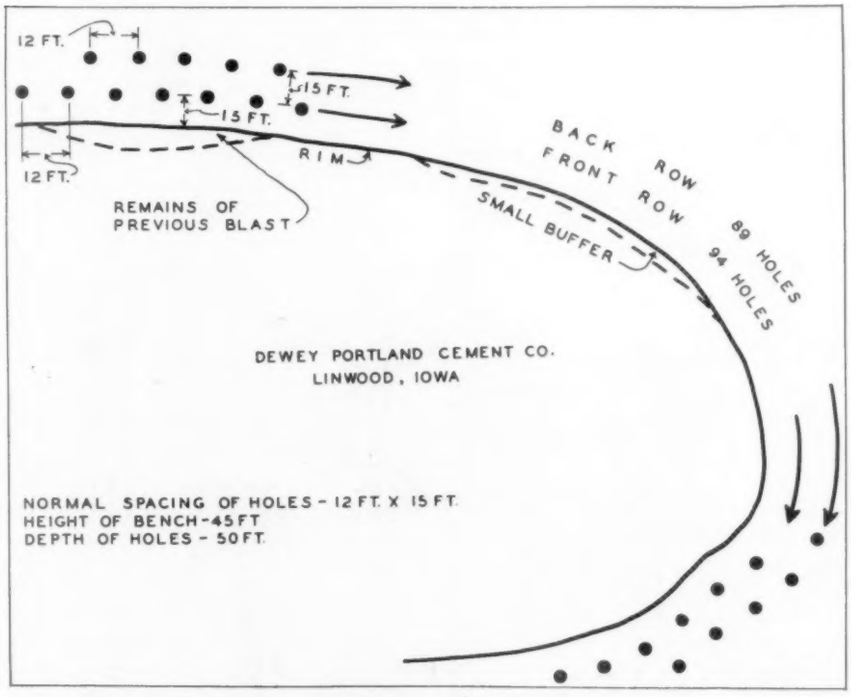
DEWEY QUARRY BLAST LOOSENS 125,000 TONS OF STONE

A BLAST in the quarry of the Dewey Portland Cement Company at Linwood, Iowa, which broke an estimated 125,000 tons of stone and which consumed approximately 36,000 pounds of powder is described by F. W. Roman of the Hercules Powder Company in a recent issue of the *Explosives Engineer*.

The quarry, which is about 100 feet deep, is worked from two benches. Stone from the top bench is used in the manufacture of cement; from the bottom bench the stone is suitable for both cement and commercial aggregates. A third bench of cement rock is not being worked at present.

The blast was made in the second bench, which averaged 45 feet in height. Well-drill holes 5⅞ inches in diameter, and averaging 50 feet deep, were drilled in two rows around the bench. The front row consisted of 94 holes, and the second of 89 holes. Rows were spaced to give 15-foot burdens between the first and second rows, and between the first row and the quarry rim (see diagram). Individual holes were spaced 12 feet apart.

Holes were loaded with approximately 18,000 pounds of semi-gelatin explosives and 18,000 pounds of high ammonia dynamite-type explosives, both in 5- by 16-inch cartridges. Distribution of powder between the front and back rows of holes was as follows: 177½ pounds in holes in the front row, and 200 pounds in each hole in the back row. Charges in the front row consisted of 87½ pounds of semi-gelatin and 90 pounds of high-ammonia dynamite. Back holes were loaded with 100 pounds of each. Charges were primed with detonating fuse.



A total of 183 well-drill holes was drilled in the middle bench. Rows were spaced 15 feet between the first and second rows, and between the first row and quarry rim. Individual holes were spaced 12 feet apart.

COMBUSTION CONTROL in ROTARY KILNS

By C. H. SONNTAG
Former Plant Manager,
Lawrence Portland Cement Company

PORTLAND cement is now universally made in rotary kilns, and other commodities, such as lime and dolomite, are also calcined in this type of furnace.

The rotary kiln has never been considered other than a very inefficient tool in the matter of utilizing the heat supplied to it, for except in certain special types the gases of combustion leave at a high temperature, and carry out much heat that could be used for drying and driving off carbon dioxide, though its temperature is below that of true clinkering. Every kiln exposes a large surface to the cooling effect of the atmosphere, and, again except in certain special types, contact between the gases of combustion and the material being calcined is not particularly intimate. The load lies along one side of the kiln, while the combustion gases pass through at high velocity, but with no great turbulence, as may be seen by observation through the chamber at the feed end. Turbulence is known to be an excellent promoter of heat transference. Heating the charge is accomplished largely by radiation from the flame and hot lining, rather than by direct conduction from the gas to the charge. These things and actual experience show that the rotary kiln is not an efficient furnace, and uses much more fuel than it should to accomplish the desired object, whether that be the manufacture of Portland-cement clinker, or burned lime or dolomite, or the nodulizing of ore.

While it is not easy to remedy some of the defects of the rotary kiln just mentioned, we can without much trouble or expense see that combustion is carried on as efficiently as possible. This will result in the highest flame temperature attainable with the fuel used, and is brought about by admitting as nearly as may be only the theoretical amount of oxygen.

Combustion as practiced commercially naturally falls into one of two classifications:

(1) That in which the gaseous products are only those resulting from the reaction between air and fuel.

(2) That in which the gaseous products contain, in addition to the gaseous products of the reaction between air and fuel, also one or more gases given off by the material being heated.

The combustion that takes place in a boiler furnace is an excellent example of the first classification. Since there is no gas other than that arising from the burning of the fuel, a very fair idea of the efficiency of combustion may be had by determining the percentage of carbon dioxide (CO_2) in the gas coming from the furnace. In such furnaces there is practically always an excess of air. If a deficiency of air is suspected, the true state of affairs will be promptly shown by an analysis for carbon monoxide (CO) and oxygen (O) in addition to the determination of CO_2.

Rotary kilns are nearly always used to calcine material that gives off CO_2 during heating, so that in them combustion usually falls into the second class. The CO_2 in the gas coming from the kiln is in excess of that resulting from the burning of the carbon in the fuel, so that it is no longer a guide to the character of the combustion taking place.

The ratio of oxygen to nitrogen in the air is practically constant. The nitrogen passes through the usual combustion process unchanged. Hence, if the percentages of nitrogen and oxygen or CO, as the case may be, are determined in the gas leaving the kiln, as well as the percentage of CO_2, the amount of excess or deficiency of air may be found, as well as the amount of CO_2 coming from the material being calcined. The method of calculation is given in texts on combustion and fur-

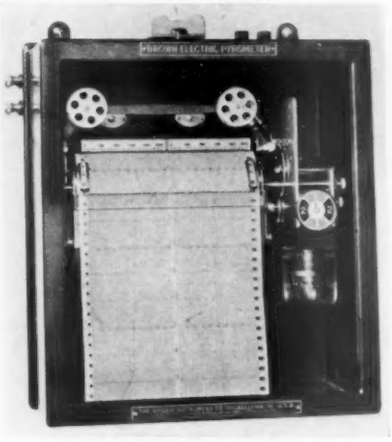


Fig. 2. Electric pyrometer making type of records shown in Figs. 3 to 5.

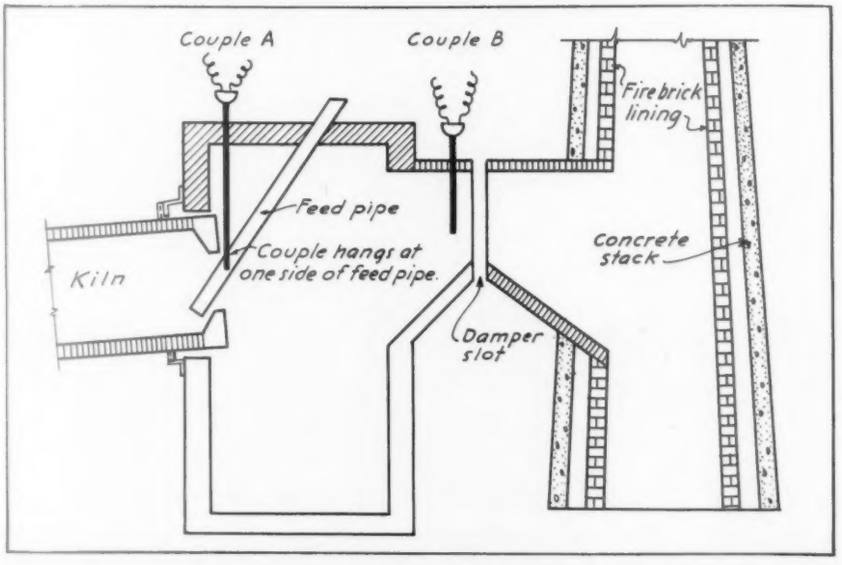
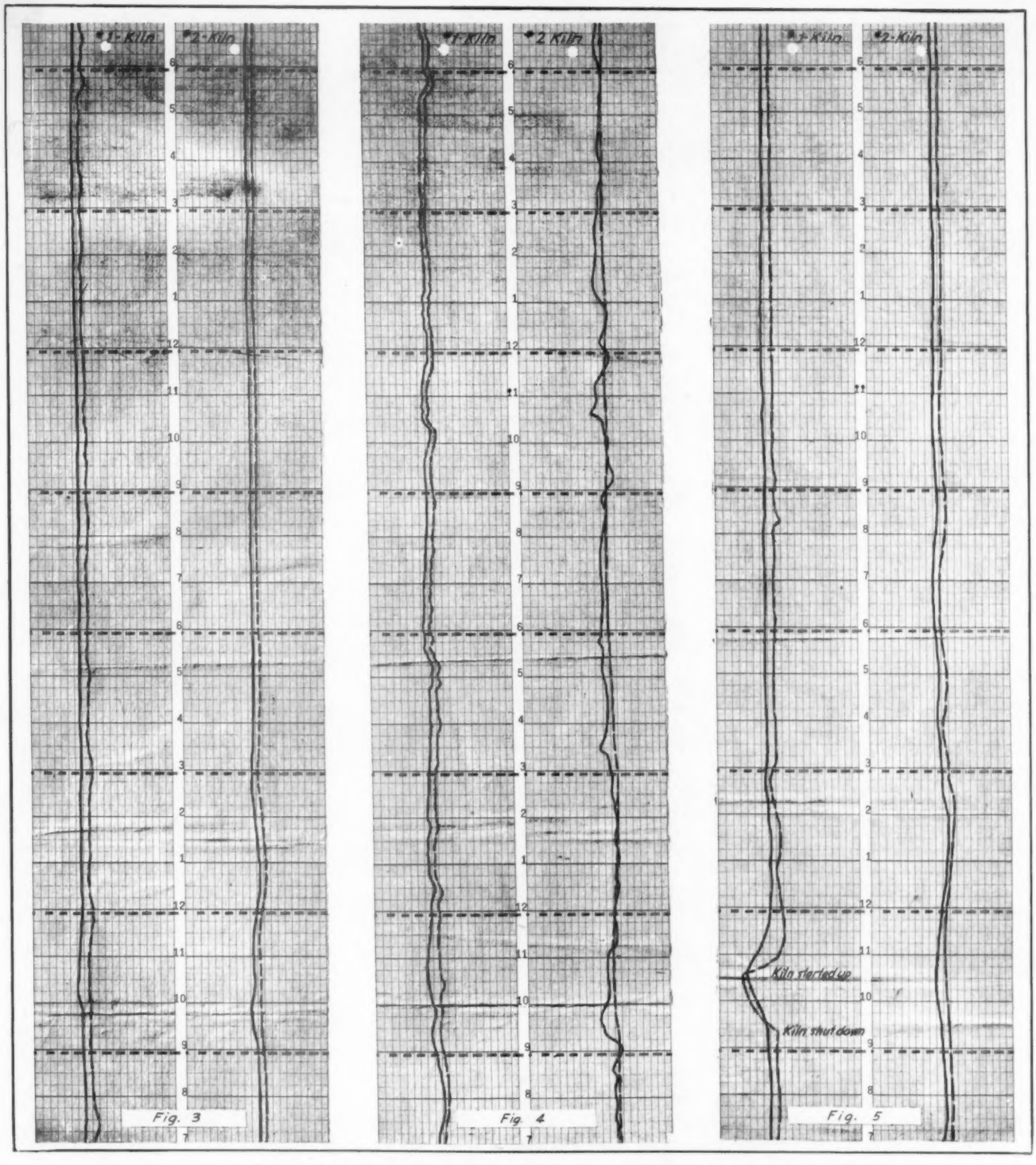


Fig. 1. Arrangement of thermo-couples for obtaining two-point gas-temperature records.



Figs. 3 (left), 4 (center) and 5. Recorder sheets showing conditions in kilns.

nace practice, and will not be repeated here.

When only CO_2 is to be determined in the effluent gas, there are several instruments on the market that will do it continuously and automatically. When CO_2 is present other than that coming from the fuel, and nitrogen and perhaps CO and oxygen are to be determined, recourse must be had to a complete Orsat apparatus in one of its modifications.

The Orsat apparatus may be used to analyze either a grab sample of gas, or one averaged over a period of time by continuous withdrawal, mixing and storage. In the first case the analysis represents conditions only as they were at the moment the sample was taken, and a few minutes later those conditions may be entirely changed. In the second case the analysis shows an average of conditions during the time in which the sample was taken, but does not indicate how those conditions may have fluctuated during that time.

In the practical operation of a kiln we are not so much concerned with the actual percentages of the constituents of the stack gas as we are that combustion in the kiln shall be as near to perfection as we know how to make it. This means combustion with the theoretical amount of air for the fuel used, and with no excess of either oxygen or CO.

When a furnace is supplied with the theoretical amount of air, or more, the gaseous products of combustion are completely burned, and will not combine further with oxygen. If less than the theoretical amount of air is supplied, most of the fuel will be completely burned, but some of it will be only partially so. The result is the presence in the effluent gas of CO and possibly hydrogen or compounds related to it, and these will complete their combustion if mixed with more air or oxygen and raised to the temperature at which they will ignite. In doing this they will evolve additional heat.

Modern kilns have seal rings at the point where they enter the dust chamber or stack base. Such seals are never truly tight, so that some air is drawn in by the draft. Air is also drawn down through the feed pipe, and in through any other available opening, such as an inspection door. Let us call this "leakage air."

If the fuel used in the kiln is burned with enough air, combustion will be complete, and the stack gas can not be made to burn further. Except for kilns equipped with chains or other surface-extending devices, the gas temperature at the feed end of a kiln is high enough to allow, and even to initiate, combustion. If the gas leaving the kiln contains combustible constituents, these will ignite and burn in the dust chamber or stack base, combustion being supported by the "leakage air," and the temperature of the gas at some distance from the end of the kiln will be higher than it is right at the end of the kiln. On the other hand, if the gas leaving the kiln is not combustible, it will be cooled by the "leakage air," and the temperature of the gas at some distance from the end of the kiln will be lower than it is in the mouth of the kiln. Then a record of the temperatures at two places in the stream of gas, one at the mouth of the kiln and one at some distance from it, will give a rough indication of combustion conditions. Specifically, it will show whether combustible constituents are present, provided the temperature is high enough to ignite them if they are present.

Fig. 1 shows the scheme used by the writer for the past nine years to get temperature records in the same stream of gas at two selected points. In it are seen two thermo-couples, made of base metals and protected by a suitable heat-resisting alloy pipe furnished by the maker of the couples. If sufficient air for combustion is supplied at the fire end of the kiln the exit gas will not burn further, and the temperature of couple B will be less than that of couple A, largely because of the diluting and cooling effect of the "leakage air." If the kiln fire does not receive sufficient air, combustion can not be complete, and the gas leaving the kiln will contain combustible constituents. They will burn in the dust chamber and evolve heat, and the temperature of couple B will approach that of couple A, and finally exceed it.

A permanent record of conditions is made by the instrument shown in Fig. 2. This is a two-pen recording pyrometer galvanometer. Each pen marks two lines in contrasting colors, in this case red (solid) and green (broken). Of these two lines the broken line is the record of couple A, the solid one of couple B. The second pen makes a similar record for another kiln. Of course an individual recorder may be used for each kiln, or one of the type shown may be used for two kilns in a plant having more than two, so that the performance of each pair of kilns will appear on one roll.

Every installation will require its own particular optimum temperatures to be established. In the one described under normal conditions couple B will be about 120 degrees F. cooler than couple A, but this figure would probably not be the same in another plant. The colors were so chosen that when the red (solid) line begins to approach the green (broken) line, and particularly if it crosses it and indicates a higher temperature, immediate corrective measures are called for.

Fig. 3 shows conditions during normal operation of both kilns. Both records are quite uniform, with no abnormalities indicated.

Fig. 4 shows reasonably correct, though irregular, operation of Number 1 kiln, but very poor operation of Number 2 kiln, caused by a ring which restricted the draft.

Fig. 5 shows fair operation of both kilns, but at about 9:20 Number 1 kiln was shut down, and started up again at 10:30. The drop in temperature during the shut-down is plainly shown, as well as the rapid rise in temperature on starting up.

It is a peculiar fact in this installation, and so far unexplained, that when the fuel supply to a kiln is shut off and its individual fan stopped, couple A cools off more rapidly than couple B. This phenomenon is shown on Fig. 5. It probably has some relation to the heat storage in the brick-work.

The couples hang in a stream of hot dusty gas, and dust will sometimes build up on them, making them follow temperature variations sluggishly. It is good to have the connecting wires long enough to allow the couples to be raised and lowered so as to cause the dust to drop off.

The equipment shown is, of course, not a gas-analysis apparatus. Its purpose is to indicate and record temperature changes brought about by variations in the composition of the effluent gas in the region of greatest efficiency, and it does this well. Aside from the renewal of couples and protecting tubes, which last about three years and are not expensive, and the cost of paper rolls for the recorder, up-keep expense has been almost nothing. It requires only routine attention, and has been in use so long that it can be recommended as one means of control that rotary kilns badly need.

The foregoing discussion has been from the viewpoint of excess or deficiency of air because that is the usual method of considering the phenomenon of combustion. It could just as well, and for rotary kilns perhaps better, be considered from the viewpoint of deficiency or excess of fuel, for excess air is equivalent to a deficiency in fuel, and *vice versa.*

The prime desideratum in the operation of a rotary kiln is that its temperature shall be high enough to properly heat-treat the material passing through it. To attain this condition most economically is the object of combustion control.

If more air is admitted to a furnace than is needed to burn the fuel, the heat energy of some of the fuel must be used to raise the temperature of the excess air to that of the furnace. If the excess air were not present it would not be necessary to heat it, so that fuel used for that purpose is wasted.

The introduction of more fuel than can be completely burned by the available air is also inefficient. Some of the heat evolved by the fuel that burns completely must be used to decompose and gasify the excess fuel, which can burn only partially or not at all. The use of heat for this purpose actually lowers the flame temperature. If the temperature in the hottest part of a kiln becomes too low for any reason, the natural thing to do is to turn on more fuel. But there is a point beyond which this is not only ineffective but detrimental. If this point is passed the gas leaving the kiln will contain combustible constituents, and the apparatus described in this paper will detect the state of affairs. If the point of maximum heat evolution has been passed, the temperature of the kiln can be raised by reducing the fuel supply so that it is in accordance with the available air. This is good practice as well as good theory, for the writer has often raised the temperature of a kiln that was too cold to make good clinker by reducing the fuel supply when the operator was using too much under the mistaken impression that more heat can always be had by feeding more fuel.

By LEO T. PARKER

Compensation Insurance Protects the Employer . . . Within Certain Limits

THE average mineral-company official believes that when an application for state compensation insurance is granted and the premiums are paid, the company is absolutely and under all circumstances protected against suits for damages by disabled employees. But in many instances this is not true.

The original purpose of workmen's state compensation laws was to assure employees of reasonable compensation for disabilities, and to enable employers to secure protection against expensive damage suits by employees; in other words, to eliminate the necessity of suing for damages. Nevertheless thousands of employers pay premiums for state industrial and compensation insurance, and ultimately are astonished when awards for damages amounting to thousands of dollars are made to injured employees.

Beware of Occupational Diseases.—Many higher courts hold that the workmen's compensation act is humanitarian in its purposes. It provides for compensation in all cases of injuries to employees arising from accidents occurring in the course of employment. It provides for compensation in such cases even though the employer was guilty of no negligence and the employee might have been guilty of negligence.

In many states the term "personal injury" used in workmen's compensation laws is limited to mean injuries of accidental origin and such diseases as naturally result from the accidental injuries. For instance, a stroke by lightning, a stroke from the direct rays of the sun, a heat stroke, or heat prostration, are accidental injuries within the meaning of these laws.

In other words, as expressed for example in the laws of leading states, such as Pennsylvania, the terms "injury" and "personal injury" are construed to mean only violence to the physical structure of the body, and such disease or infection as naturally results therefrom. In other words, the laws of Pennsylvania and many other states do not provide compensation for illness arising from occupational disease, unless it results from violence.

However, this does not mean that the workmen's compensation act applies to all cases where workmen receive injuries which do "violence to the physical structure of the body." Every disease affecting human beings is pathologically an alteration of the normal, "healthy" condition of the human body.

Now, the important question is: In states where the laws do not provide for the payment of compensation to employees who contract occupational diseases, when and under what circumstances is the employer liable for payment of damages to employees who suffer occupational diseases?

Status of Silicosis.—A higher court has rendered an important decision, which is a leading case and undoubtedly will be followed by the courts in all other states in which the workmen's compensation laws do not provide for payment of compensation to employees who contract occupational disease. This important case is Billo *v.* Allegheny, 195 Atl. 110.

The facts of this case are that an employee was employed in a grinding department using emery wheels for a period of five years, when he became ill and incapacitated. At the beginning of his employment in that department there were nine grinders in operation and later twenty. No exhaust-fans were supplied to draw off the resulting dust, although such devices were in use in another department of the same mill. After a time the employee testified and offered other testimony to prove that he had contracted silicosis. Since the laws of the state do not provide for compensation to employees who contract occupational diseases, the employee sued the employer for damages and alleged that he had contracted the occupational disease of silicosis as a result of inhaling, while in the grinding department of the plant, a quantity of steel, ascoloy, and carborundum dust, causing him physical injuries permanent in character. These injuries resulted, according to his allegations, from the negligence of the employer in failing to supply : (1) adequate exhaust fans to carry off the dust, and (2) sufficient ventilation, all which were required by state laws. Also the employee alleged that the employer failed to supply him with reasonable and safe appliances with which to work and that the employer failed to warn him of the danger to his health from the inhalation of the dust generated by the emery wheels.

In view of the testimony the lower court held the employer liable in the amount of $6,000. The employer appealed to the higher court which granted a new trial, because it believed that more testimony was needed to prove conclusively that the employee contracted the disease as a result of the negligence of the employer. This court stated an important law, as follows:

"It is well settled that an employee has a common-law right of action against his employer for injuries caused by disease contracted by the employee in the course of his employment and due to the negligent conduct of the employer in violation of a statutory duty."

Also, in Fritz *v.* Elk Company, 258 Pa. 180, 101 A. 958, 960, the court held that where a company knew of the existence of poisonous fumes and did not provide for their elimination by exhaust fans or other sufficient devices, a workman who was poisoned by inhaling these fumes and who was injured thereby without any negligence on his part was entitled to recover damages.

And again in Plazak *v.* Allegheny Steel Company, 188 A. 130, the right of an employee to recover damages for an occupational disease resulting from the negligence of his employer was recognized, and the doctrine was reiterated that failure of the employer to provide for the employee a reasonable and safe place in which to work resulted in the employer being liable in damages.

Beware of Laws.—It is quite impossible to review the compensation statutes of all the states. However, the various laws in different states are similar in many respects. Therefore, while readers should be certain to construe the laws in their respective states, yet in this article, in order to warn readers of legal pitfalls, it will be sufficient to review state laws on which higher courts recently have rendered important opinions.

As previously mentioned, it is well known that practically all the states have enacted laws which require employers to pay stipulated insurance rates in order to provide compensation insurance so that the dependents of employees who sustain injuries or are killed may receive benefits from these insurance payments.

Generally speaking, of course, an employer who provides state compensation insurance can not be sued by an injured employee for damages, because the employer's contribution to the insurance fund is intended to provide the employee with ample income during the

period that he is disabled, and payments to his dependents are provided in the event that he is killed.

However, state compensation insurance protects an employee only while he is acting within the scope of his employment. And since an employer is not liable in damages to an employee who is injured while he acts outside the scope of his employment, this phase is not important to nonmetallic-mineral firms' owners and officials.

Frequently an employer who believes that he is protecting himself and his employees by regularly contributing for many years to the state compensation fund may be astonished to discover that when an employee is injured or killed, the employee can not receive insurance benefits from the state and under certain circumstances the employee may sue him to recover damages.

For illustration, in the leading case of Hamilton *v.* J. Le Roy Company, 261 N. W. 506, it was disclosed that a Mr. Hamilton acted as manager of a plant. At certain seasons Hamilton would sweep the floors, keep the fires, take out ashes, and do various other kinds of manual labor around the plant. During the seasons that the plant was in operation Hamilton exercised general supervision of the plant operations. One day Hamilton was seriously injured while engaged in taking an inventory of stock located in the warehouse of the factory. Since the owner of the plant had for many years been paying into the state fund for compensation insurance he quite naturally expected that Hamilton should be paid compensation insurance for the injury and that he could not sue for damages.

However, the Industrial Commission refused to approve Hamilton's compensation claim on the grounds that Hamilton was not an employee protected by the compensation insurance laws because at certain periods he acted as a representative or manager of the plant and the state law *excluded from compensation benefits all employees who acted in a representative capacity for their employer.* In other words, although the employer has paid compensation-insurance premiums for many years, he was not protected against damage suits by his employees, nor were his employees entitled to compensation payment, if at any one or more times they acted temporarily in a representative capacity for him, although at all other times they did the kind of work which entitled them to compensation protection and they were injured while performing this kind of work.

Complications Dangerous. — Now, take the compensation laws of another state, whose laws coincide with the laws of many other states. The laws of certain states provide that every employer who employs regularly three or more employees—in some states five or more —must pay state industrial-insurance premiums. Also, these laws provide that employers who post notices, supplied by the commission, stating that they carry insurance, shall *not* be sued by injured employees, or their dependents, for damages. If the employer forgets to post these notices in conspicuous places, or the industrial commission neglects to send the notices, the employee *may* sue for damages.

Another part of the usual law states that employers who employ fewer than three employees may obtain insurance, but they are *not* protected against suits by injured employees for damages unless such employers send a *written notice* to each employee stating that they have paid premiums for industrial insurance. Therefore, if an employer fails to send a written notice to each of his employees, he may pay industrial insurance for years and then an injured employee, or the dependents of a killed employee, has, or have, the privilege of suing the employer for damages instead of accepting payments from the industrial commission. Very frequently the employee prefers to file suit because he believes that he can recover a greater amount for the injury.

Another portion of the law provides that all employers who have paid insurance premiums may be sued by employees who are injured either wilfully or because the employer failed to comply with "lawful requirements for the protection of the lives and safety of employees."

What is meant by an employer failing to comply with "lawful requirements for the protection of the lives and safety of employees?" In a leading case (91 O. S. 205) it was held that if an employer fails to place a guard on a mechanical apparatus, the employee may sue instead of accepting compensation.

One higher court said that a "lawful requirement" probably never will have its limits definitely and exclusively defined. It said: "The requirement of guarding dangerous machinery can not be construed as a requirement to prevent a machine from becoming out of order and repair. It is inevitable that all machines require repairs from time to time, but not at any stated time, and it is not often that any warning is given prior to the actual condition of being out of order and repair."

We Fail to Think

To the Editor:

Recently a man employed at a cement mill in Ohio fell while working outside the mill building at night. In going to the engine house to build a fire in a locomotive he tripped and fell over some timbers which some one had carelessly left in the pathway. He broke three ribs, endured a lot of suffering, and lost several weeks' wages.

Much has been said in regard to good housekeeping within the mill buildings to help in reducing accidents, but we should, and must, extend this good housekeeping rule to the outside of the mill buildings as well. Also, we should never, upon leaving the confines of the mill building, leave all thoughts of safety first behind.

In order to obtain the most in safety-first work we must think and act safely at all times. Regardless of what we do or where we go, safety first should be the thought uppermost in our minds, for we know that safety-first work is as essential to mankind as food and clothing.

Workmen to-day in all lines of manufacturing are enjoying the best in machinery, tools, working conditions and safety devices of all kinds. Everything has, and is being, done to protect them.

Now one will say, "Why have accidents in mills where we have all this protection?" The answer is that we, the workmen, know we have it and we depend on it to protect us. Also we depend largely on our fellow workman to do our watching and thinking for us.

Some of us are taking this safety-first work for granted. We take chances and fail to think before it is too late. Four words will about explain the cause of all accidents. They are: "We failed to think."

Years ago, when the country was young and the woods were alive with savages and wild animals, man had to be always on the alert. He had to do his own thinking and watching. But is the man of to-day forever on the alert? To-day we depend on the other fellow to do our watching and thinking for us. To prove this go to some busy downtown intersection and watch the people when crossing the street. How many of these people before crossing will look to the right and the left for approaching cars? You will find that only about two out of ten will look. The others will cross without looking. The reason so many will do this is because they depend on the other fellow to look for them. The pedestrian expects the driver to look out for him and believes the driver is doing so.

We are fast becoming a nation of non-watchers and non-thinkers. I believe we had better get our thinking machinery in good working order again and keep it that way. In failing to do this we may be the direct cause of eliminating ourselves.

KILN BURNER

Dayton, Ohio

A view of the upstream side of the dam from the west bank. The twin mixing plant is at the extreme right and in the distant background are the aggregate plant and down-hill conveyor.

Revamp Sand-and-Gravel Plant at Grand Coulee; Construction of Dam Enters Final Stages

By W. E. TRAUFFER

GRAND COULEE DAM, which is nearing completion at Mason City, Washington, is the largest dam ever built. It will also set a record for speed of construction and many records have already been made in the actual construction and in related operations. Most of these records have been widely discussed in the engineering press. Less well-known, but much more important to aggregates producers, is the effect this and similar projects have had, and will continue to have, on aggregate-production methods and specifications. One of the most important developments is the system devised for dividing the sand into three size fractions and automatically recombining these to give the desired gradation.

At Boulder Dam sand-preparation methods were used which made it possible to produce continuously a sand having almost exactly the desired fineness modulus. The methods used were described in a complete discussion of these operations published in the October 19, 1932 issue of PIT AND QUARRY.

The lower section of Coulee Dam, or the Low Dam, was built by the Mason, Walsh, Atkinson, Kier Company, a consolidation of three large construction companies formed for this project. This section of the dam, containing 4,530,000 cubic yards of concrete, was completed in January, 1938. To supply aggregates for this work the contractors had built a sand-and-gravel plant near the site with a designed capacity of 1,000 tons per hour of washed and graded aggregates. Two concrete-mixing plants were used, one at each end of the dam. These plants and related operations were described in detail in the January, 1936 issue of PIT AND QUARRY.

Only a few minor changes were made in the plant during this period and most of these were necessary because of changes in the nature of the raw material. In spite of one of the worst deposits from which high-grade aggregates were ever produced, this plant actually produced 526,112 cubic yards of graded aggregates in the month of August, 1937. In that month 395,967 cubic yards of concrete was poured. The biggest day's pour, on August 29, 1937, was 15,844 cubic yards. Because the deposit ran high in sand, about double the amount of usable material had to be excavated and processed. About 65 per cent. of the material is sand, of which about 25 per cent. is needed.

Four vibrating screens were used for coarse sizing of the gravel. The sand passing through the No. 4 bottom decks of the eight final sizing screens was carried, with the wash water, to the settling basins of eight drag-type dewaterers from which the 100-mesh sand was allowed to overflow. A conveyor carried the sand to the first of three Dorr bowl classifiers operating in series. The first classifier had a 13-foot diameter bowl and an 8- by 35-foot rake. Minus 20-mesh sand overflowed to the second classifier, which had a 16-foot bowl and an 8- by 35-foot rake. The minus 48-mesh sand overflowed to the third classifier, which had a 25-foot diameter bowl and a 6- by 39½-foot rake. Minus 100-mesh material was allowed to overflow.

Two-way split chutes made it possible to feed any desired proportion of each of the three sand fractions to individual stock-piling belt-conveyors. After being allowed to drain in stockpiles, the fractions were piled over a tunnel and blended in the desired proportion by variable-speed feeders discharging on the reclaiming belt-conveyor.

As the Low Dam neared completion

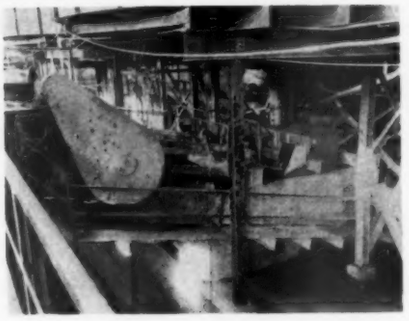
A view from the pit showing the aggregate plant with clarifiers in foreground. The dam is at left. Behind the plant is the waste-sand pile.

the material coming from the pit ran even higher in sand content, and it was found necessary to increase the sand-classifying capacity. This was achieved by installing four sand-boxes in the flumes between the final screens and the sand-drags. These boxes removed some of the excess fines, relieving the load on the classifiers and making it possible to control the gradation even better than before. The load on the final screens was also relieved to some extent by equipping their bottom decks with ¼-inch clear opening wire cloth in place of No. 4.

Attempts to get coarser material in the pit included the opening of several new levels. Finally a 36- by 42-inch jaw crusher was installed in the pit and two tractors with bulldozers were used to feed to it the bowlders which had been rejected by the 16-inch grizzly on the pit hopper. Later three crawler wagons were used to haul bowlders from the more distant sections of the pit. These bowlders had accumulated in considerable quantity and this additional coarse material overloaded the original crushing and scalping equipment. A second 20-inch Type B Telsmith gyratory reduction crusher was installed to help reduce the oversize from the two revolving scalping screens to the 6-inch maximum required. The four original coarse sizing screens were replaced by four new Allis-Chalmers 5- by 10-foot heavy-duty vibrating screens of greater capacity. The two original 5-cubic yard electric shovels in the pit were supplemented by two shovels—a 4-cubic yard and a 2-cubic yard—which were used to load the rejected bowlders in the wagons.

When this portion of the dam was completed the aggregate plant, as specified in the original contract, became the property of the Bureau of Reclamation. This was done so that all the contractors bidding on the top portion of the dam would start on the same footing. The successful bidder on the High Dam was Consolidated Builders, Inc., a consolidation of M.W.A.K. and a number of other contracting firms. This firm on March 15, 1938 took over the contract and the aggregate- and concrete-producing facilities. Late in the summer of 1938 these plants were again in full operation. The completion of this contract calls for the pouring of over 6,000,000 cubic yards of concrete by April, 1942, a feat well on the way to achievement. Up to September 24, 1939, the date of the writer's third biennial visit to this project, 7,800,000 cubic yards of concrete had been placed in the dam.

The pit operations were changed to some extent and extensive alterations were made in the plant. Considerable new equipment was added to make possible even greater capacity and closer control. Two Bucyrus-Erie 120-B shovels, designed for 4-cubic yard dippers, are equipped with 7-cubic yard Electric Steel Foundry Company Esco lightweight dippers. A Marion Model 4101 drag-line, with a bucket open at both ends, works at the top of the 190-foot face, breaking down material for the shovels. These shovels load a hopper on the end of a pendulum conveyor. An 18-inch grizzly over the hopper rejects bowlders, which are hauled in wagons drawn by Caterpillar tractors to a new 56- by 72-inch Buchanan jaw crusher. The minus 10-inch product of this crusher falls on the other material on this conveyor, which feeds the 16,000-



Rake classifier under one of the bowls.

Some of the bowl classifiers and the scale end of the classifier building.

cubic yard capacity plant-feed storage-pile.

The four coarse-sizing screens are now equipped with 3-inch and 1½-inch cloth on their top and bottom decks respectively. The minus 1½-inch material passing through the bottom decks goes to the eight final sizing screens. Six of these are new 5- by 10-foot Tyler Ty-Rock screens and two are Allis-Chalmers Style B screens. Their top decks have ¾-inch cloth and their bottom decks are equipped with cloth ranging from ⅜-inch down to No. 4 as needed. Rex spray nozzles are used.

The fine material passing through the bottom decks of these screens flows, with the wash water, through launders to a distributor, from which it goes to the feed wells of three new Dorr Hydroseparators. These are 35 feet in diameter and 9 feet deep and are equipped with classifying rakes. Excess water, containing extremely fine sand and most of the clay, overflows the peripheral weirs and is carried away. The coarser sand is settled out and deposited by the revolving rake in central discharge cones. Additional water is

The 4,770-foot belt-conveyor which carries all aggregates down hill from the aggregate plant to mixing-plant storage.

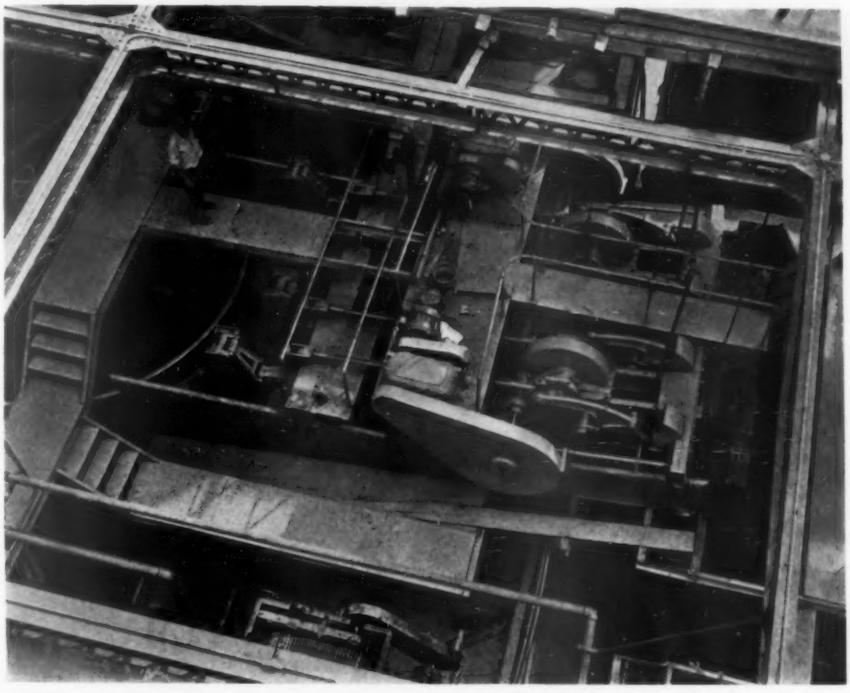
added at these cones for the final removal of the extreme fines.

The sand is discharged from these three cones into the three new Dorr 14- by 30-foot Type FX heavy-duty rake classifiers below them. These produce a coarse sand between 3/16-inch and 28-mesh which is split in any desired proportions to two belt-conveyors. One of these is a waste conveyor and the other leads to the sand-blending plant.

The overflow from these classifiers goes to the original three Dorr bowl classifiers for further separation into two fractions. These are now arranged so that the 16-foot classifier is followed in order by the 13-foot and 25-foot classifiers. The first two bowls produce a 28- to 48-mesh intermediate fraction and the final bowl makes the 48- to 100-mesh fine fraction. These two fractions are discharged on separate blending conveyors. Any desired amount of the product of any of the bowls can also be discharged on the waste conveyor. All the overflows in this department go to the two huge Dorr classifying tanks installed with the original plant.

These three conveyors discharge the coarse fractions into hoppers, from which they are fed automatically in the desired proportions to individual belt-conveyors. The coarse fraction fed to Belt No. 1 usually has a fineness modulus ranging from 3.20 to 3.80. The medium and fine fractions go to Belts No. 2 and 3 respectively. Originally each belt-conveyor was equipped with a Toledo Chronoflo Telemeter scale, a conveying weigher and totalizer developed jointly by the Toledo Scale Company and the Builders' Iron Foundry. Now only two of these scales are needed as the amount of fine fraction on the No. 3 belt is so small and consistent that it can be estimated with sufficient accuracy. The third Chronoflo has been installed on the finished-material belt-conveyor which takes the blended sand to storage. Chronoflows have also been installed on the two plant-feed conveyors to measure the input of raw material. These installations have also proved invaluable as keeping an accurate record the input of raw materials and the output of sand makes it possible to adjust the plant for the most efficient and economical operation.

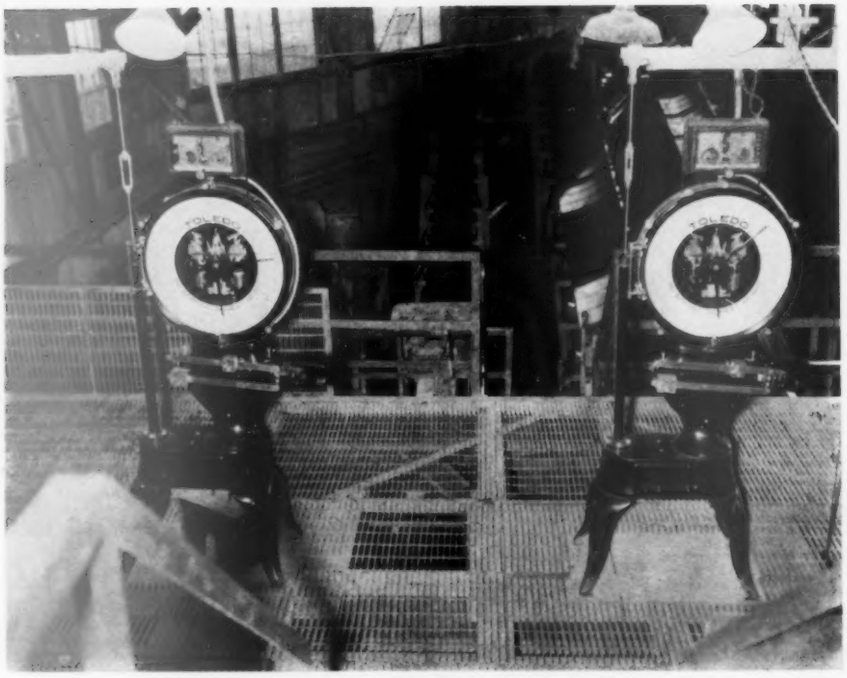
The three sand fractions discharged on the three constant-speed blending belts are tested for fineness modulus at frequent intervals. The necessary proportions for the desired gradation of finished sand are quickly worked out and the Chronoflows are set accordingly. Once set, they hold the rate of feed steady by automatically adjusting the hopper feed gates to meet varying conditions. This is accomplished by mercoid switches that control the speed of the Reeves variable-speed feeder drives. Excess material in each hopper overflows the back end of the hopper and falls on a waste conveyor.



Looking down on one of the bowl-and-rake classifiers.

The accuracy of this automatic control system is apparent from results taken at random from the records. At one time, on August 18, 1939, the fine-

The two 5-cubic yard shovels loading the pit hopper. The drag-line above breaks down the bank with an open-end bucket.



The two scales used for blending materials onto conveyors.

ness moduli of the coarse, medium and fine fractions were 3.68, 2.67 and 1.02 respectively. In order to make the desired blend at a point within .20 either way from 2.90 as specified it was necessary to feed these fractions at the rate of 225, 400, and 35 tons per hour respectively. The actual product had a fineness modulus of 2.78. The average for August was 2.82 at the concrete-mixing plant, where the Bureau of Reclamation makes its acceptance tests. As a courtesy to the contractor the bureau also makes tests immediately after blending.

Because of the continual variation in the gradation of the sand fed to this department and the varying proportions of the three fractions, there is also necessarily a wide variation in the output of blended sand. In one day the rate of output has varied from 450 up to 1,985 tons per hour with an average feed of 2,200 tons per hour. When the blended-sand stock-pile is filled to capacity the amount of material wasted is increased sufficiently to keep the output of the blending system even with the rate of withdrawal from storage.

Before this system was installed the three fractions of sand were stock-piled separately and later recombined before being conveyed to the final storage near the concrete-mixing plants. The present system stores the blended sand, which is then conveyed to the mixing-plant storage. An automatic traveling tripper stock-piles the sand in layers over the reclaiming conveyor to prevent segregation. This method is so effective that the blend at the mixing plant is found to be even better than that at the blending plant. After draining 24 hours the sand is ready for use.

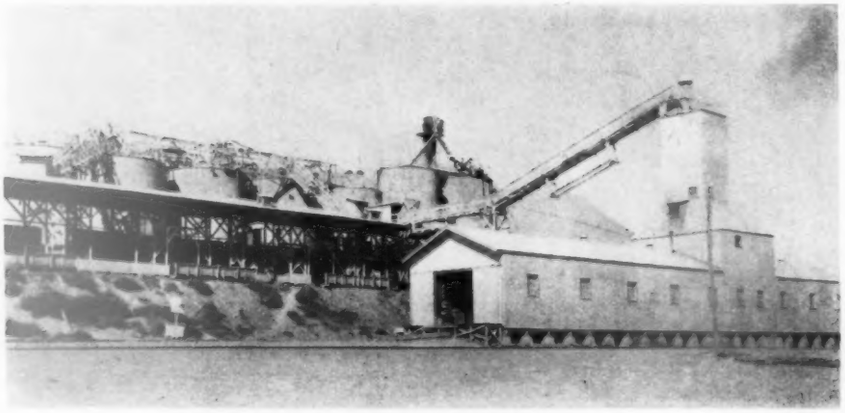
Through August 31, 1939 a total of 5,434,405 tons of aggregates was produced on this contract and 11,315,000 tons of raw material was fed to the plant. The waste totaled 5,880,595 tons, or about 52 per cent. of the feed. Records were set on June 13, 1939, when 69,945 tons of material was fed to the plant. On one 7-hour 55-minute shift 3,246 tons was processed.

In the original set-up aggregates were conveyed to the concrete-plant stock-piling system by a series of three 48-inch belt-conveyors, respectively 2,157, 1,715 and 1,068 feet in length. These conveyors had a drop of 180 feet in their combined lengths and their motors were regenerative. This system was replaced with what was then the world's longest single belt-conveyor. This conveyor is 48 inches wide and 4,770 feet long from head to tail pulley. It is operated at the rate of 725 feet per minute and has a capacity of 3,000 tons per hour. It has a 125-horsepower motor, which is regenerative. Goodyear conveyor belting and Rex conveyor idlers are used.

The 56-inch by 72-inch jaw-crusher in the pit which reduces bowlders. Gravel conveyor is above.

For the second half of this dam the west mixing plant was no longer needed. The equipment from this plant was combined with that of the east plant, which is now a dual mixing plant. In this plant are two sets of eight 4-cubic yard Koehring conical mixers, each with its own set of C. S. Johnson Company bins and batchers and automatic control system. The 3,500-foot suspension bridge over which aggregates were conveyed to the west mixing plant was torn down.

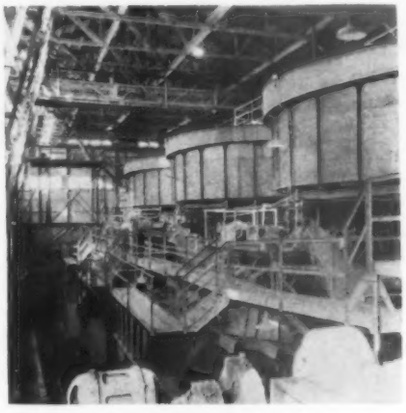
This mixing plant on May 25, 1939 set a world's record for production, which many construction men believe will never be exceeded. On this day, working three 8-hour shifts, 20,684 cubic yards of concrete was mixed and placed. This was an average of 1 cubic yard every 4.18 seconds, or 861 cubic yards per hour. The "peak" produc-



The bulk-cement unloading-and-blending plant.

tion for one hour was 912 cubic yards. Usually concrete production is limited by the form space available but on this day conditions were ideal and forms were ready for 28,000 cubic yards of mass concrete. The average day's pour for the month of August, 1939, was 12,389 cubic yards.

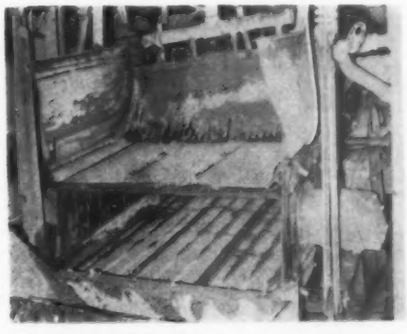
This record day's pour was achieved with a 2-minute mix on the graveyard shift, 1 minute 55 seconds on the day shift and 1 minute 50 seconds on the swing shift. The theoretical capacity of the plant was exceeded by 2,252 cubic yards, or nearly 10 per cent. All this



Three bowl classifiers with rakes and belt-conveyors below.

was made possible by perfect synchronization of the aggregate-producing operations, the cement blending-and-unloading plant, the mixing plant and the placing operations. More than 5,000 men were engaged in a friendly rivalry to keep their particular departments from retarding operations.

The cement storage-and-loading plant is located on the west bank of the river and cement was formerly pumped from it to both mixing plants, with the line to the east mixing plant crossing the river on the suspension bridge. Now the two lines to the dual-mixing plant on the east bank run under the construction trestle over the top of the dam, a distance of 7,200 feet. This line drops about 100 feet at the feed end and rises about the same distance at the other end to the mixing-plant bins.



One of the fine-sizing screens.

One of the remote-controlled portable cement unloaders in a box-car.

Some changes have also been made in the blending plant.

Cement is unloaded from box-cars by three 100-horsepower Fuller-Kinyon Type D portable cement unloaders operated by remote control. Each of these is capable of unloading a car of bulk cement in 30 minutes. Together these machines have unloaded 16,000 barrels of cement in 16 hours, and 108 cars of 240 barrels each, or nearly 26,000 barrels in 24 hours. Two Clark shovels are used for cleaning out the corners of the cars.

Different brands of cement are stored in separate silos and these are blended when cement is withdrawn by the feeders and screw-conveyors controlled by Reeves variable-speed drives. The plant's blending capacity is about 1,000 barrels per hour.

In the lower-dam section modified Type B cement was used exclusively. In the High Dam Type A low-heat cement is being used in the main body and modified Type B cement in the thinner sections such as power-house walls, etc. Each type of cement is stored and handled separately. Only one unit of the mixing plant is used for modified cement, which is supplied to the plant by a Smidth Fluxo pump through a 9-inch line. Low-heat cement is pumped by another Fluxo pump through a 14-inch line. On "Record Day" approximately 22,000 barrels of cement was pumped to the mixing plant. Work in the blending plant is done by 13 men on each shift.

Bureau of Mines Gives Data on Progress

Giving preliminary release to information that later will be reviewed in Minerals Yearbook, 1940, the Bureau of Mines is issuing an information circular entitled *Nonmetallic Mineral Industries in 1939*, by Tyler and Bowles. Specific information is given on 34 leading items.

As a class, the nonmetallic-mineral industries fared better than other industries in 1939. However, most of them followed much the same general pattern—hesitant or declining in the first quarter, turning upward after May, and rising rapidly after the outbreak of war in Europe. Larger quantities of several mineral raw materials were needed for the chemical and process industries and were being produced at the close of the year at an all-time record rate. Substantial gains in building projects brought recovery to such industries as cement, lime, gypsum, crushed stone, sand, and gravel.

After trailing behind metal mining, technology in the nonmetallic-mineral industries has spurted ahead in the last decade, and at present some of these industries are leading in the technologic race. Many of these new developments are reviewed in this report, copies of which may be obtained without charge on request to the Bureau of Mines, Washington, D. C.

Feldspar in Active Demand Last Year

Notwithstanding the increasing use of competitive materials the domestic demand for feldspar was active in 1939. Shipments greatly exceeded those of the preceding year, though they probably were short of the all-time record of 1937. The trend toward more feldspar in container glass continued, and the reduction of imports of pottery from Japan and Czechoslovakia boosted the business of American potters. Prices of feldspar held firm, with a rising tendency, until the last two months when sharp competition caused reductions of 20 to 30 per cent. The industry still has about four times as much grinding capacity as it needs, the Bureau of Mines says.

Aplite, which came on the market late in 1938, is a white, massive rock consisting of albite, sericite, zoisite, microcline, and other materials and occurs extensively near Piney River, Virginia. After grinding and screening through 20-mesh and elimination of fines the product averages 0.27 per cent. ferric oxide. Although it can be used only in amber, green, or other colored-glass products, a good market has been found for it among manufacturers of certain types of glass containers. The fines (minus 100-mesh) contain even more iron than the sand sizes, and a market for this material would be a boon to the company.

Some of the New England feldspar deposits are being reworked for graphic granite and similar natural mixtures of feldspars and quartz. The flotation mill of the Golding-Keene Company, at Keene, New Hampshire, was inactive in 1939, but the Bureau of Mines has continued its research in the separation of quartz and feldspar; excellent results are obtained by additions of lauryl amine hydrochloride and fluorine-bearing acids or salts in an acid circuit.

By F. W. DARNER
Chairman, Grants of Aid Committee
Agricultural Adjustment Administration

A Specification Summary for Ground Limestone Under the A. A. A. Program

PRIMARILY as a result of the conservation features of the Agricultural Adjustment Administration farm program, the use of liming materials for agricultural purposes has greatly expanded since 1935. The following table shows the estimated tonnage of all agricultural-liming materials consumed annually since 1929:

Year	*Total Tons Utilized*
1929	3,736,367
1930	3,498,296
1931	2,548,941
1932	1,839,715
1933	1.627,057
1934	2,433,841
1935	3,291,789
1936	6,305,426
1937	6,800,735
1938	7,047,560

Of the total tonnage utilized during 1936, nearly four million tons were applied for credit under the 1936 Agricultural Conservation Program. Approximately five million tons were applied for credit in each of the years 1937 and 1938.

It is probable that the tonnage utilized in 1939 will show an increase over 1938 and since the need for agricultural liming materials is relatively limitless, further increases may be expected from year to year so long as the Agricultural Adjustment Administration continues to place major emphasis on the correction of soil acidity as a basic soil conservation practice. Producers of crushed limestone may, therefore, find a satisfactory outlet for waste screenings by grinding them so as to meet the specifications for full credit under the Agricultural Adjustment Administration program. In order that these specifications may be better understood, a brief summary of the liming provisions of the program is submitted.

The basic liming provisions along with other basic provisions of the program are contained in the National Agricultural Conservation Program Bulletin, adopted each year at the beginning of the Agricultural Conservation Program. These provisions are amplified in the several state bulletins and are further amplified and interpreted by rulings of the respective state committees of the Agricultural Adjustment Administration. Since at this writing the various state bulletins for the 1940 program are not available, discussion will be confined to the 1939 program. However, the liming provisions of the 1940 program are expected to be substantially the same as those for 1939. As the grades and classes of liming materials available for agriculture use, and the prevailing market prices therefor, vary considerably from state to state, the provisions of the National Bulletin apply only to rates of payment. These provisions authorize a payment of $1.50 for each unit of practices carried out on the farm up to the number of units in the soil-building goal. Among the approved practices that may be carried out for one unit's credit under the program is the following:

"Application of the following quantities of ground limestone or its equivalent in areas designated by the Administrator as areas in which the average cost of ground limestone to farmers is:

(a) Not more than $2.00 per ton ..... 2,000 pounds
(b) More than $2.00 but not more than $3.00 per ton 1,500 pounds
(c) More than $3.00 but not more than $5.00 per ton 1,000 pounds
(d) More than $5.00 per ton ..... 600 pounds"

The liming provisions of the Agricultural Adjustment Administration farm program provide an increasing outlet for agricultural-liming materials. These provisions have recognized differences in quality of available liming materials in various sections of the country. Producers of crushed limestone can find a satisfactory outlet for their waste screenings by processing them to meet standards for agricultural limestone prevailing in their distribution area. Before installing additional equipment producers should communicate with the State Agricultural Adjustment Administration committees, or with the Agricultural Adjustment Administration, Washington, D. C., with regard to the specification requirements for the area in which it is proposed to distribute the material.

It will be noted that farmers may be reimbursed from $1.50 per ton to $5.00 per ton for the application of ground limestone, depending upon the average market price of the material in the area concerned.

State bulletins amplify the provisions of the National Bulletin. The quantity of ground limestone required to earn one unit of credit is prescribed, together with the specification for ground limestone and the table of equivalents for other liming materials. In any case where the state bulletin does not cover all details, rulings of the state committee are issued in this respect. In adopting specifications and rulings, recommendations of state agronomists and other technicians are considered.

In addition to the regular provisions of the program, under which farmers are reimbursed at a rate approximating the out-of-pocket cost for applying liming materials, the Bulletin contains a provision under which liming materials may be furnished to farmers as grants of aid in lieu of conservation payments:

"Wherever it is found practicable limestone, superphosphate, trees, seeds, and other materials, upon request of the producer, may be furnished by the Agricultural Adjustment Administration as grants of aid to be used in carrying out approved soil-building practices which shall be counted toward meeting the soil-building goal for the farm. Wherever such materials are furnished, a deduction from the payment for the farm shall be made in the amount of the approximate average cost of such material to the Agricultural Adjustment Administration in the county, state, or other area."

As reflected above the program is adjusted to meet conditions in the state or area concerned, as well as to recommendations of state experts, and specifications as to fineness are drafted accordingly. In states where the limestone is relatively soft in texture most of the agricultural-liming material is prepared as a by-product of crushed-stone operations, and where the crops grown permit a rather wide range in pH values, coarsely-ground limestone is adopted as standard. For example, in a number of areas the application of limestone ground sufficiently fine so that

(Continued on page 58)

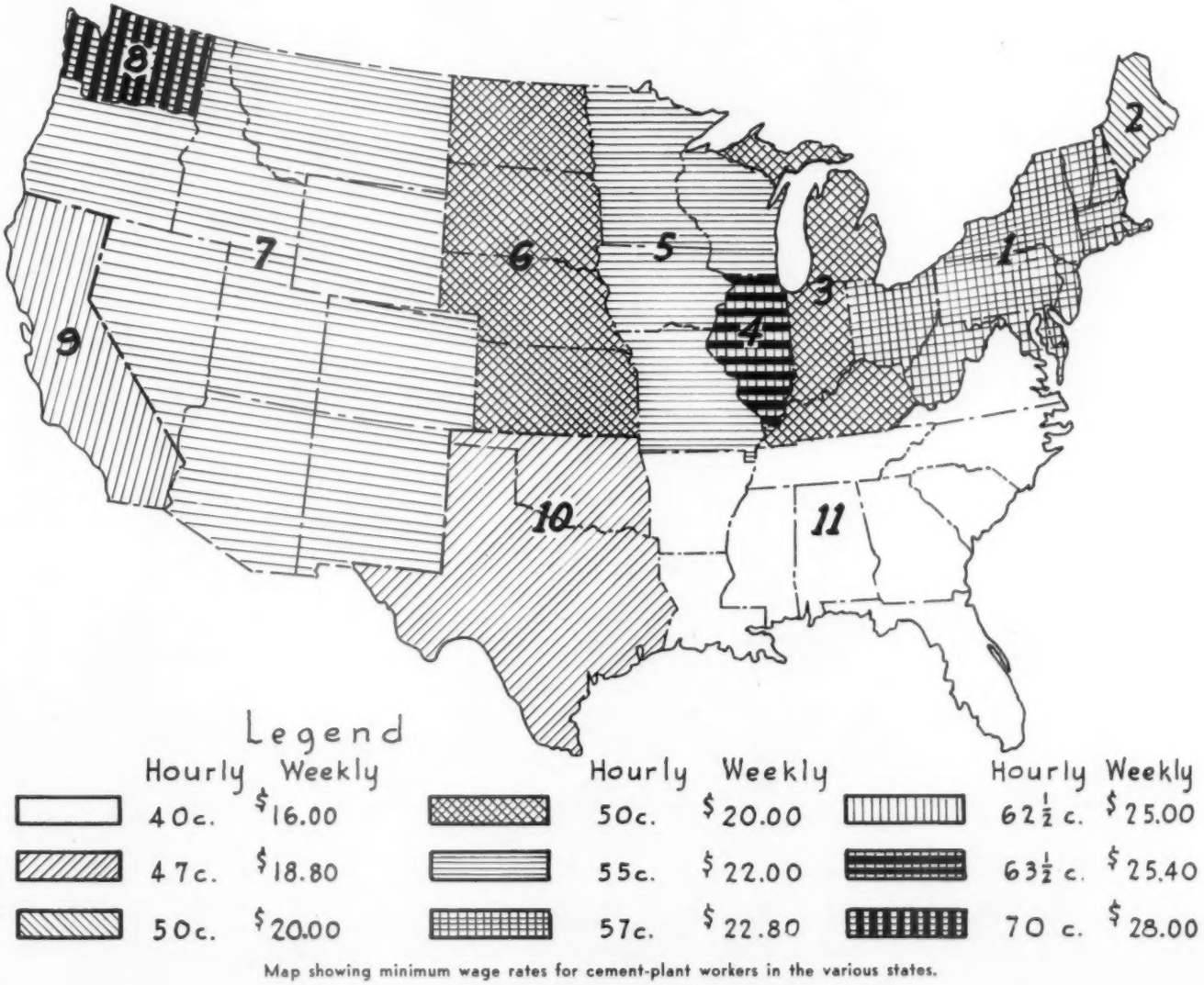
FIX MINIMUM WAGES FOR CEMENT PLANTS

BY a prevailing-minimum-wage determination dated February 2, Secretary of Labor Frances Perkins has fixed the minimum wages that must be paid by cement manufacturers to employees engaged in the performance of contracts with agencies of the United States Government subject to Section 1 (b) of the Act of June 30, 1936 (49 Stat. 2036; 41 N.S.C. Sup. III 35), commonly known as the Walsh-Healey Act. The minimum wages set out in the determination become effective and apply to all such contracts for which bids are solicited on or after March 2, 1940.

The Public Contracts Board, created in accordance with Section 4 of that act, held a hearing on the question of prevailing minimum wages in the cement industry on April 5, 1938. Notice of the hearing and an invitation to attend, "sent to all known members of the industry, to labor unions, to trade publications, and to trade associations in the field", resulted in the appearance of 19 members of the industry, 7 of whom testified. Testimony was also given by the National Council of United Cement Workers (now known as the United Cement, Lime and Gypsum Worker's International union), and by the American Federation of Labor.

A cement - industry committee, headed by W. H. Klein, vice-president and general operating manager, Pennsylvania-Dixie Cement Corporation, Nazareth, Pennsylvania, presented tabular data as of October, 1937, showing the total number of employees, the number of employees at the base rate, and the base rate in the principal cement plants of the United States. On July 19, 1938 the board made and circulated its recommendations to give interested persons an opportunity to object or approve. Nineteen members of the industry and the A. F. of L., acting for the then National Council of United Cement Workers, filed briefs expressing objections. On March 13, 1939 the A. F. of L. requested a rehearing on the question of prevailing minimum wages on the ground that there had been changes in the industry's wage structure and that evidence of these changes should be considered before any wage determination was made. The cement-industry committee then submitted new data bringing the wage study down to March, 1939. On August 19, 1939, the A. F. of L. petitioned for a review and reconsideration of the new recommendations made by the board, in the light of the committee's revised data. As a result, on September 1, 1939, the board changed its recommendations in some particulars.

Subsequently nine members of the industry and the now United Cement, Lime, and Gypsum Workers' Interna-



Map showing minimum wage rates for cement-plant workers in the various states.

tional Union submitted new briefs, which made objection generally to the recommendation of lower wages for one part of a "competitive area" than for another. Most of these objections were raised by cement manufacturers having plants close to the borders of the localities recommended by the board. The existence of competition in one direction, while an important fact, was not considered by the board to be "in itself necessarily controlling".

The Secretary of Labor in her determination of February 2, 1940, finds the board's findings and determination sustained by the evidence and orders that the prevailing minimum wages listed below become applicable on and after March 2 in the localities indicated. The accompanying map presents the wage data for the eleven districts graphically.

The cement industry is defined as including "the manufacture of Portland cements, which comply with the standard specifications of the American Society for Testing Materials, as well as modified or treated Portland cements; and also the manufacture of pozzuolana, masonry, and natural cements".

The following tabulation shows the geographical divisions of the country, the numbers of the localities in which the various states are included, and the hourly and weekly rates set up in tthe Secretary's determination. These rates apply whether compensation is made on a time or piece-rate basis.

States	Locality	Minimum Wages Per Hour	Minimum Wages Per Week of 40 Hours
NEW ENGLAND STATES:			
Maine	2	50c	$20.00
Connecticut, Massachusetts, New Hampshire, Rhode Island, Vermont	1	57c	22.80
MIDDLE ATLANTIC STATES:			
New Jersey, New York, Pennsylvania	1	57c	22.80
SOUTH ATLANTIC STATES:			
Delaware, District of Columbia, Maryland, West Virginia	1	57c	22.80
Florida, Georgia, North Carolina, South Carolina, Virginia	11	40c	16.00
EAST NORTH-CENTRAL STATES:			
Illinois	4	63½c	25.40
Indiana, Michigan	3	50c	20.00
Ohio	1	57c	22.80
Wisconsin	5	55c	22.80
EAST SOUTH-CENTRAL STATES:			
Alabama, Mississippi, Tennessee	11	40c	16.00
Kentucky	3	50c	20.00
WEST NORTH-CENTRAL STATES:			
Iowa, Minnesota, Missouri	5	55c	22.00
Kansas, Nebraska, North Dakota, South Dakota	6	50c	20.00
WEST SOUTH-CENTRAL STATES:			
Arkansas, Louisiana	11	40c	16.00
Oklahoma, Texas	10	47c	18.80
MOUNTAIN STATES:			
Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming	7	55c	22.00
PACIFIC STATES:			
California	9	62½c	25.00
Oregon	7	55c	22.00
Washington	8	70c	28.00

Crushed-limestone producers, wishing to prepare their waste screenings for agricultural use, should communicate with the State Agricultural Adjustment Administration committees for the states in which the material will be distributed before installing additional screens or equipment in order that the finished product will meet not only the present minimum specifications but probable future requirements as well.

A. A. A. (from page 56)

at least 90 per cent. will pass a 10-mesh sieve (with all the finer particles included), will receive full credit ($1.50 per ton in most counties). Any material coarser than the above is classed as "screenings" and receives only two-thirds credit. These are minimum specifications and are set sufficiently low so as to include most material normally used for agricultural purposes. In northeastern states, to receive full credit 100 per cent. of the ground limestone used must pass a 20-mesh sieve, with all the finer particles included. In some of these states as least 25 per cent. of the ground limestone must pass a 100-mesh sieve and in another state at least 60 per cent. must pass a 100-mesh sieve, while in some others at least 50 per cent. must pass a 100-mesh sieve.

In many states, especially those in which the payment for the liming practice is at the rate of $1.50 per ton, material containing not less than 80 per cent. of calcium-carbonate equivalents and meeting the minimum screen requirements will qualify for full credit. In other states, especially those where the rate of payment per ton is relatively high, the material must consist of at least 90 per cent. calcium carbonate. In most states magnesium oxides or carbonates are accepted as having a greater neutralizing value than that of calcium oxides or carbonates, and the specifications call for calcium oxide or carbonate "equivalents." However, in some states, specification requirements are in terms of total calcium and magnesium oxides or carbonates, no extra value being given to the magnesium compounds. On the other hand, some states and areas, where magnesium deficiencies have been demonstrated, not only recognize a superior neutralizing value in magnesium over calcium, but recommend, and give preference to, high magnesium liming materials. Communities outside the magnesium deficiency areas, but receiving bulk ground limestone in open-top cars, often prefer dolomitic material because of its non-caking qualities when moist.

Symposium on Lime

A symposium on lime comprising eleven technical papers prepared by outstanding authors and dealing especially with problems in the practical application of lime in its various forms, at the same time covering a number of fundamental aspects, and various research and technical angles, has been published by the A. S. T. M.

Following a discussion on the variations in properties of dolomitic-lime putties with method of hydration and one on the hydration of magnesian lime and the autoclave test, there are covered important questions in the manufacture of lime for the glass industry, factors affecting milks of lime employed in industry, and the quality of lime desired for water treatment.

Of interest in connection with treatment of industrial and municipal waters is a paper dealing with the prevention of after-precipitation. Soil acidity and liming, and criteria for the evaluation of agricultural ground limestone are also covered in detail in two papers.

The investigation of the determination of fluorine in lime and the fundamental mechanics of calcination and hydration of lime and methods of control are discussed, the latter in particular at considerable length.

The concluding paper is an extensive one describing lime characteristics and their effect on construction.

Copies can be obtained from the American Society for Testing Materials, Philadelphia, at $1.50 in cloth; $1.25 in paper cover.

Builds Wyoming Plant for Union Pacific

A $125,000 gravel-processing plant will be built near Evanston, Wyoming, for the Union Pacific railroad, it was announced by the Utah Sand & Gravel Products Corporation of Salt Lake City, which will erect the plant.

The Union Pacific railroad has announced that its Buford gravel pits west of Cheyenne will be opened this spring with about 60 men employed. This will be a slight increase over the number of men working in the pits during the 1939 season.

PERSONAL MENTION

GEORGE A. MATTISON, JR., of Woodstock Slag Corporation, Birmingham, was elected president of the National Slag Association at the annual meeting held February 15 and 16 at the Raleigh Hotel in Washington, D. C. Other officers: L. E. MCDERMUTT, Illinois Slag & Ballast Company, Chicago, vice-president; H. J. LOVE and T. E. SHEAFER, Washington, D. C., managing director-treasurer, and secretary, respectively.

CHARLES E. FIFER, head of the National Burial Vault Company of Indianapolis and Evansville, Indiana, was injured when a tornado swept Evansville early in March, destroying the plant.

H. S. COULTER of Hot Springs, New Mexico, reports the discovery of a large deposit of Italian-type marble near that place and is seeking a market for the material.

MURHL R. SMITH is opening a crushed-stone plant at a quarry north of Montpelier, Indiana. Agricultural limestone will also be produced.

WILLIAM C. JOHNSON has been made sales manager of the Crushing and Cement-Machinery Division of the Allis-Chalmers Manufacturing Company. Mr. Johnson, until recently manager of the company's Knoxville office, will now have charge of all sales activities of his division, both in the home office and in the field.

JOHN E. CARLSON and A. WINKLER PRINS have been appointed district sales managers for Williams buckets by the Wellman Engineering Company, Cleveland, Ohio. Mr. Prins will be located in New York with offices at 30 Church Street. Mr. Carlson will maintain offices in the equipment division of the Great Lakes Supply Corporation in Chicago.

JOHN E. CARROLL has been appointed manager of the Chicago office of the American Hoist & Derrick Company.

GERALD TULGETSKE, 25, fireman, was killed and HARRY SCHEFKE, 29, engineer was seriously injured when their locomotive left the tracks in the quarry of the Michigan Limestone & Chemical Company, Rogers City, Michigan.

EDWARD B. KENDALL, 53, an official of Pacific Coast Aggregates, Inc., and the Transit Concrete Company, San Francisco, died March 3 after a week's illness.

THEODORE B. HUDSON, 38, manager of the Rosoff Sand & Gravel Company, Marlboro, New York, died at Kingston Tuberculosis Hospital after an illness of 18 months.

FRED H. BULLEN, 72, president of the Fountain Sand & Gravel Company, Pueblo, Colorado, died of pneumonia several weeks ago.

Joins A. H. Puffer

The name of the A. H. Puffer Company of Rockford, Illinois, was changed March 1 to A. H. Puffer & Company, Inc., through the addition of a partner, B. O. Eighmy, recently sales manager of Link-Belt Speeder Corporation. With this change, the concern becomes northwestern Illinois distributor for the full line of Link-Belt Speeder shovels-draglines-cranes, both Speeder and Speed-o-Matic, providing a single source of sales and service for all Link-Belt Speeder products.

A. H. Puffer, president and general manager of the new organization, is well known in the equipment field. For approximately 15 years he has distributed and serviced Cedar Rapids crushing and material-handling equipment and has recently acquired the Dempster-Dumpster line.

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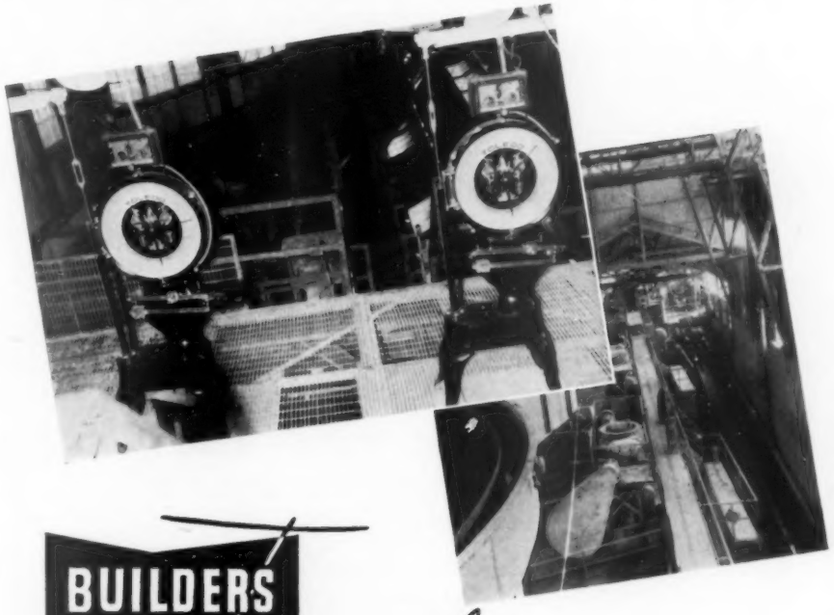

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OCCUPATIONAL DISEASES AND THE LAW

Discovery of Disease

Smith v. Federated Metals Corporation, et al., decided by the St. Louis (Missouri) Court of Appeals, December 5, 1939, rehearing denied December 19, 1939; reported at 133 S. W. (2d) 1112.

This was an appeal from an award of compensation for permanent total disability from an occupational disease —lead poisoning—which the employee was found to have contracted in his employment. The sole point in issue was whether the claim was filed within six months from the time it became reasonably discoverable and apparent that a compensable disease had been contracted. It was the employee's contention that the occupational disease he was found to have contracted did not culminate in a compensable disability until the time of his discharge from employment, which was within six months before the filing of the claim. The employer and insurer, on the other hand, argued that the employee had known for at least four years before his discharge that he was suffering from a condition or disease which he attributed to the incidents of his employment, and that the period of limitation had elapsed.

"Following the rule which obtains with respect to latent injuries generally, which is that the limitation period begins to run from the time it becomes reasonably discoverable and apparent that a compensable injury has been sustained, it has been specifically held that in an occupational disease case the 'injury' which starts the running of the statute occurs at that time when the disease produces a compensable disability. *Renfro v. Pittsburgh Plate Glass Company,* Mo. App., 130 S. W. (2d) 165. In other words, it is not enough to start the running of the statute that the employee shall merely have reason to know or believe that he is suffering ill effects, which, even though attributable to the natural incidents of his employment, have not progressed to the point of in anywise impairing his capacity for work, but instead it must be reasonably discoverable and apparent to him that he has suffered a compensable injury, which can not be the case until his disease, if occupational in its origin, results in disability of some degree which can be the subject of compensation under the act. Absent disability in some degree, there is no 'injury' in an occupational-disease case, and as the act is written it is the occurrence of 'injury' which marks the beginning of the period within which a proceeding for compensation may be maintained."

Whether or not a claim for compensation has been filed within six months after the "injury" is a question of fact where there is a dispute about the time of the "injury," which question says the court is to be determined by the Workmen's Compensation Commission like any other factual issue in the case. In this case there was testimony that the employee had been absent from work but not for causes incident to his work, and that "smoke chills" which he had suffered before his discharge were caused by zinc fumes and were not due to the lead poisoning for which the compensation was awarded. The evidence is held to be competent to sustain the award, and the judgment of the lower court, which in turn affirmed the award, is affirmed.

Procedure

Belanowitz v. Travelers Insurance Company, decided by the Supreme Court of New Jersey, January 3, 1940;

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reported at 10 Atl. (2d) 178. The workman involved in this case received an award for partial permanent disability from an occupational disease, mercury poisoning. In 1939 an award for increased disability was made against the insurance carrier, the employer having become bankrupt, but without notice to or participation. The court rules that this procedure invalidates the award since it "offends the orderly course of judicial proceedings and cannot be reconciled with the constitutional requirements." It also happens that the insurance contract, while in force at the time the workman first suffered the effects of the disease, had expired before the workman became so incapacitated as to quit work. The carrier consequently is held not liable, since "the right to compensation for an occupational disability accrues when the disability occurs, not when the first symptoms appear."

Time Limit

Ruffertshafer v. Robert Gage Coal Company, decided by the Michigan Supreme Court, December 19, 1939; reported at 289 N. W. 151.

The workmen involved in this case was a coal miner for the defendant company for seven or eight years beginning in 1919, then farmed for a year or two, worked as a coal miner for another company for about seven years, and finally reëntered the defendant's employ in June, 1937, as a coal miner. He worked until the last of March, 1938. A few months later he filed a compensation claim under the Michigan occupational-disease statute (Act No. 61, Public Acts of 1937), claiming that he was suffering from silicosis contracted while in the employ of the defendant and that the silicosis resulted from the nature of his employment. The Department of Labor and Industry awarded compensation. That award, however, is reversed by the Supreme Court in this appeal, on the ground of a stipulation that there is no evidence that the silicosis was contracted within twelve months previous to the date of disablement, and a construction of the applicable statute.

In Michigan the liability of the employer is to be determined as of the date of the disablement of the employee. Section 5 of Act No. 61, Public Acts of 1937, provides that the employee shall not be entitled to compensation for disability resulting from occupational disease unless the disease is due to the nature of the employment, was contracted therein, or in a continuous employment similar to the one in which the workman was engaged at the time of his disablement "within twelve months previous to the date of disablement, whether under one or more employers." An examination of the legislative journals convinces the court that the legislature deliberately chose the limitation that there be no liability unless the occupational disease was contracted within twelve months previous to the date of disablement, and rejected the proposal that compensation benefits on account of silicosis be payable only in the event of such disability or death resulting within two years after the last injurious exposure.

In the present case it was stipulated that there was no evidence indicating that the silicosis was contracted within twelve months previous to the date of disablement; rather, the record indicated that it had been in existence or had its beginning from five to ten years previous to such date. With such a stipulation, the award of compensation must be reversed.

LABOR DECISIONS

Flow of Commerce

National Labor Relations Board v. H. E. Fletcher Company, decided by the U. S. Circuit Court of Appeals, First Circuit, December 18, 1939; reported at 108 Fed. (2d) 459.

The respondent in this case operates a granite quarry and mill in Massachusetts. With the exception of relatively small amounts of explosives and coal, which it procures in Massachusetts, it requires no supplies other than the granite in its quarries. Shipments of the product outside Massachusetts amounted (in the period considered) to 25.3 per cent. of total shipments by tonnage and 44.9 per cent. by value. The great majority of shipments outside the state are made f. o. b. quarry to customers in near states. The company, contesting an order of the National Labor Relations Board, claimed that the board was without jurisdiction, on the ground that the industry was local in character and the company's operations, if stopped by industrial trouble, would in no way obstruct or interfere with the free flow of interstate commerce. On this point, however, the court says that, in view of the findings of fact concerning the nature of the operations and a long line of decisions which have recently come down from the Supreme Court, "it would be purely an academic effort to discuss at length

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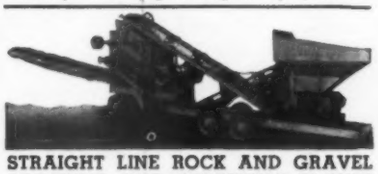

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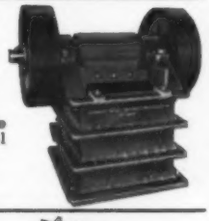

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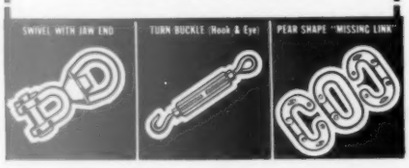

this point raised by the respondent. The contentions raised . . . have been discussed in these cases at length, and in accordance with the principles laid down in them, it appears there is ample justification for the exercise of Federal power, and the provisions of the act are applicable to the operations of the present respondent."

The order of the board directed the company to withdraw all recognition from an Employees' Representation Plan of the company as collective-bargaining agent for its employees, and, in general, to cease and desist from interfering with, restraining or coercing the employees in the exercise of their right of self-organization. An examination of the facts convinces the court that the existing employees' organization was dominated by the employer, and the board's order will be enforced. The company is likewise ordered not to give effect to a contract with the plan, which was "the outcome of the domination and interference of the respondent over the plan and was a consequence of the unfair labor practices."

Barge Tenders

Lawrimoore et al. v. Union Bag & Paper Corporation, decided by the U. S. District Court, Southern District of Georgia, November 15, 1939; reported at 30 Fed. Supp. 647.

This was a suit by certain employees to recover double the amount of unpaid minimum wages and unpaid overtime compensation under Section 16(b) of the Fair Labor Standards Act of 1938. The employees are barge tenders employed on barges in which pulpwood was transported on inland waterways. Because of the peculiar facts of the employment, the court found "no sufficient, satisfactory evidence upon which could be fairly found a judgment showing the number of hours that the barge men were at work", or that they worked beyond the 44 hours a week and were paid less than the required amount of 25 cents an hour (which the employees had the burden of proving). More decisive, however, is the court's decision, on expert testimony and a review of precedents, that under the facts of the case the barge men were "seamen," expressly excluded from the application of the act (Section 13(a)(3). Judgment was given in favor of the employer.

Must Be a Controversy

F. W. Maurer & Sons Company v. Andrews, decided by the U. S. District Court, Eastern District of Pennsylvania, December 7, 1939; reported at 30 Fed. Supp 637.

In this action a manufacturer of shade-tassels, fringes, etc., asked the court to declare its legal rights and relations under the Fair Labor Standards Act of 1938 with regard to its engagement of industrial home workers. The practice concerned was discontinued, but by its petition the company sought to learn from the court whether, if the wages and hours of its industrial home workers should be substandard, it would be liable to the penalties of the act.

However, even though the petition has a "real problem," the court concludes that it is without power to grant the declaratory judgment sought, because there is no "actual controversy". The regional director of the Wage and Hour Division had orally advised the petitioner that the engagement of industrial home workers at substantial wage and hour rates would be a violation of the act. The court could find no evidence, however, that this view had been adopted by the Admonostrator; "there is no action threatened, proposed or suggested by anyone who has the right to act, and there has not even been any authoritative expression of opinion from anyone as to what the view of the Government is." Lacking any "actual controversy," the petition is dismissed.

Majority Representation

New York State Labor Relations Board et al v. Astoria Casket Company, Inc., decided by the New York Supreme Court, Special Term, Queens County, December 8, 1939; reported at 17 N. Y. S. (2d) 13.

This decision was on an application by the New York State Labor Relations Board for enforcement of an order directing the respondent company to give jobs back to certain men and to bargain in good faith with the union found to represent a majority of the employees at the time in dispute. The board's findings are found to be supported by substantial evidence and the petition for enforcement of the order is granted. The employer sought to show that the union does not represent a majority of its employees. Under subdivision 3 of section 705 of the New York Labor Law the employer has a right to question the union's representation of employees and petition the board to make a determination thereon. However, no such action was taken, and the contention was made for the first time in this proceeding. The fact that after a strike some employees have returned to work is held not to indicate a genuine desire not to be represented by the union. "Economic distress resulting from long unemployment is probably the real reason for such action and the return of such em-

ployees to work does not exculpate respondent's unlawful conduct as found by the board after hearings duly conducted." In any event, the events subsequent to the acts which brought about the proceedings before the board did not affect the legal conclusion.

Interstate Commerce

National Labor Relations Board v. Cowell Portland Cement Company, etc., decided by the U. S. Circuit Court of Appeals, Ninth Circuit, November 28, 1939, rehearing denied December 30, 1939; reported at 108 Fed. (2d) 198.

The respondent company's activities are confined to the manufacturing of cement, and its products are sold by the Henry Cowell Lime & Cement Company, which owns approximately 95 per cent. of its capital stock; the bill of lading, however, is made out by the manufacturing company to the ultimate consumer procured by the agency of the sales company. In the proceedings before the National Labor Relations Board and again in the review proceedings before the Circuit Court of Appeals the manufacturing company maintained that it was not subject to the jurisdiction of the board because its business was not in, and did not affect, interstate commerce. The court rules, however, that in view of the agency connection of the sales company with the sales of the cement, "there is no merit in the contention that because it is a separate corporation from respondent there is a break in any shipment out of the state rendering respondent's activities solely intrastate in character."

The interstate commerce involved consists of imports (about 2,000 tons of gypsum a year, and white cement for resale, amounting to 1,100 barrels in the seven months before the hearing) and exports. The exports of cement were found by the board to have been between 30,000 and 50,000 barrels a year during the three years before the hearing. The company disputed those figures, but admitted exports of at least 14,000 barrels per year. Even accepting the 14,000 figure, the court rules that the fact that this is but a small percentage of the company's total sales does not make the interstate commerce a negligible quantity. "Otherwise, we would have the anomaly of one plant under federal regulation because exporting its entire product of 14,000 barrels while alongside it another competing plant under state regulation because, though shipping the same amount of 14,000 barrels, they constituted, say, but 4 per cent. of its product. Nor is the quantity of a particular product negligible in the eyes of the law "merely because it is small in proportion to the total interstate commerce in that product from all the states or from the employer's state."

"Though respondent's manufacturing activities, separately considered, be deemed intrastate in character," says the court, "they bear a direct relationship to its interstate activities. Stoppage of respondent's interstate shipments, constituting interruption of, or interference with, the flow of interstate commerce, would directly follow from stoppage by industrial strike of its manufacturing operations. Here the board charged such industrial strife and upon the evidence found that it existed and constituted such interference with the flow of interstate commerce we hold that respondent's activities bring it within the scope of the federal regulating power of the National Labor Relations Act and that the proceeding was within the board's jurisdiction."

The board's order, which it sought to enforce in this proceeding, directed the invalidation of a closed-shop agreement made with a A. F. of L. union. The court finds that that union was not a party to the proceedings, which it had a right to be, and remands the case to the board for further proceedings to correct that error.

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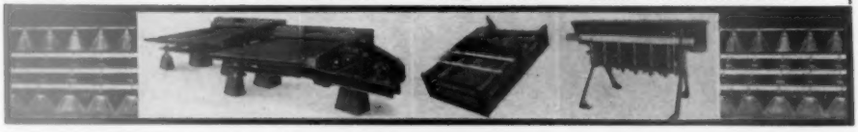

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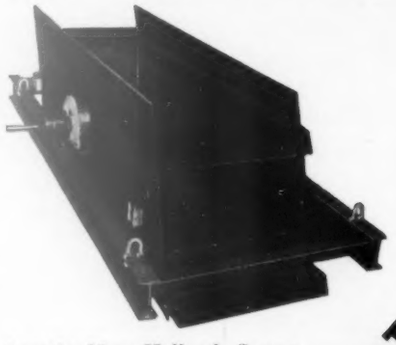

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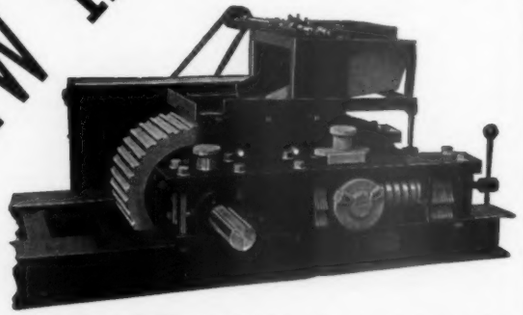

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Threat of Shut-Down

National Labor Relations Board v. Asheville Hosiery Company, decided by the U. S. Circuit Court of Appeals, Fourth Circuit, December 15, 1939; reported at 108 Fed. (2d) 288.

This case came before the court upon application by the National Labor Relations Board for a decree to enforce its order directing the respondent company to cease and desist from discouraging membership in a Union affiliated with the C. I. O. and to offer reinstatement and back pay to certain employees which the board found to have been discharged for union activities or ousted by the workers themselves in anti-union activities for which the board held the company responsible. Concerning these portions of the order, the court finds that there was not substantial evidence to support the board's findings that the company had engaged in "unfair labor practices," and those portions of the order, consequently, are stricken out.

Further portions of the order directed the employer to cease and desist from stating or intimating to its employees that in the event of unionization, the plant would be shut down or cease operations, and from in any manner interfering with its employees in the exercise of the right to self-organization. The court finds that these portions of the order should stand because there was a fair inference that a speech made to the employees was designed to influence the workers against union membership through the statement that the owner of almost the entire stock of the corporation disliked unions and might shut down the plant. "It was an unwarranted interference with the efforts of some of the workers to form a local union and, therefore, an unfair labor practice in violation of the National Labor Relations Act, to suggest that the mill might be closed if it were unionized. It is a fair inference from the evidence that the management had no intention of closing the plant. The board has held that while a *bona fide* shut-down of a plant does not constitute a violation of the act, a shut-down not made in good faith, and intended to discourage unionization, is illegal. *Matter of Shelba Ann Frocks,* 5 N. L. R. B. 12; *Matter of Somerset Shoe Company,* 5 N. L. R. B. 486."

Reinstatement

C. G. Conn, Ltd., v. National Labor Reletions Board, decided by the U. S. Circuit Court of Appeals, Seventh Circuit, December 22, 1939, reported at 108 Fed. (2d) 390.

The complaint which began the proceedings involved in this case was is-

sued by the National Labor Relations Board upon the complaint of a union. After a hearing had been held, and while certain further proceedings were pending, the board entered an order permitting the union to withdraw its charge and dismissed the complaint, "without prejudice to the board's right to reinstate." Subsequently the complaint was reinstated, and further proceedings were held on the basis of the earlier proceedings and evidence introduced at the original hearing. The validity of this action was disputed by the respondent company, but is favorably decided by the board because the right to reinstate was expressly reserved (which the court concludes the board had the power to do), and the original evidence is permitted to stand in the absence of any request by the company to offer additional testimony concerning changed conditions.

On the merits, however, the court decides in favor of the respondent company and denies enforcement of the board's order. From a detailed review of the record the court failed to find satisfactory evidence that the company had refused reëmployment to certain former employees because of their membership in a labor organization, or their concerted activities for the purpose of collective bargaining. Also, the acts and statements of the company's officers and supervisory officials were found not to justify a conclusion that they interfered with the employees in the exercise of the rights guaranteed them by the National Labor Relations Act.

Inside Union

L. Greif & Brothers, Inc. (Carroll Workers' Association of Westminster, Intervenor) v. National Labor Relations Board, decided by the U. S. Circuit Court of Appeals, Fourth Circuit, December 28, 1939; reported at 108 Fed. (2d) 551.

The issue in this case was purely one of fact, whether a union formed by the employees' of a single employer was dominated by the employer. An association of employees had existed before the U. S. Supreme Court in 1937 ruled that the National Labor Relations Act was constitutional. After that decision was announced the company called its employees together and had its attorney explain that the old association would no longer be able to serve as a collective-bargaining agent, and that the employees were free to join an outside union, to form a union of their own, or to join no union at all. The employees subsequently organized their own union, which the company recognized, and with which it made a contract increasing wages.

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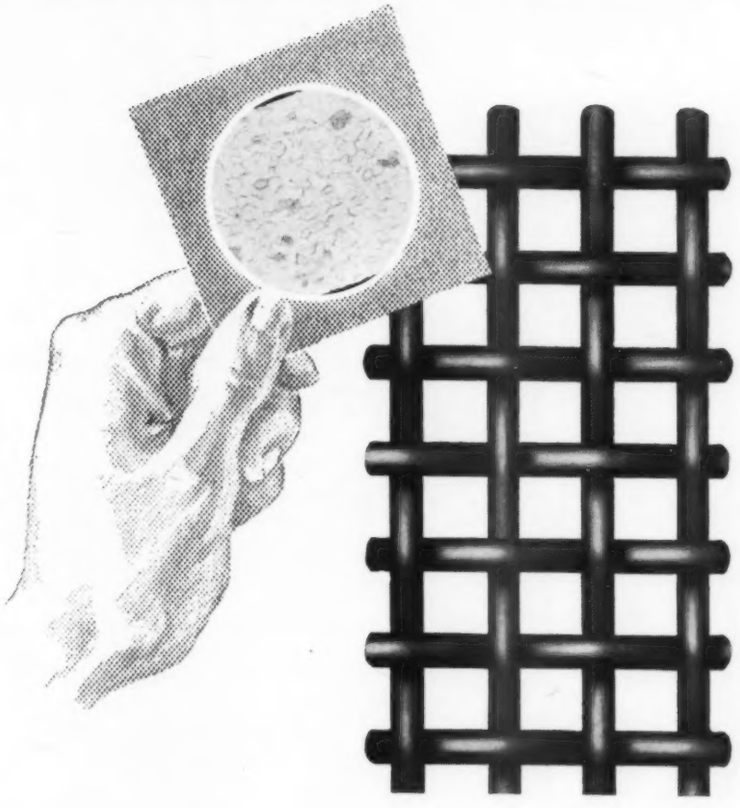

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On complaint of an outside union, the National Labor Relations Board conducted an investigation; concluded that in various ways the company or its attorney had given undue stress to the possibility of forming an independent union; and ordered the disestablishment of that union and the withdrawal of recognition from it. A detailed examination of the facts convinces the court that this finding and order were unjustified; that the old union had been completely disestablished that the employees were satisfactorily informed of their freedom of action; and that the new independent association is not dominated or interfered with by the company. The board's order, accordingly, is set aside.

FOREIGN DEVELOPMENTS

The Constitution of Portland Cement IV

K. Koyanagi and T. Sudoh present from the laboratory of the Chichibu Cement Company, Ltd., a contribution to the question of the constitution of Portland cement IV. They have constructed pure $3CaO \cdot SiO_2$ synthetically, using the Dyckerhoff and the Hansen methods, and have subjected both specimens to Roentgenographic examination to determine the differences between $3CaO \cdot SiO_2$ and alit. They have concluded that alit does not consist of pure $3CaO \cdot SiO_2$ but is a mixed crystal of $3CaO \cdot SiO_2$ and some other substance. They determined the substances which are part of the mixed crystal formation of $3CaO \cdot SiO_2$ proving that alit consists of a mixed crystal of $3CaO \cdot SiO_2$ (with smaller quantities of MgO and $3CaO \cdot Al_2O_3$) and that $3CaO \cdot SiO_2$ can take up 1.0 to 1.5 per cent. MgO in its crystal-lattice in the state of a fixed solution (investigations in reference to tricalcium aluminate taken up by tricalcium silicate are to be reported later). A microscopic examination made of cement clinker obtained by the Basset method showed that alit possesses a zonar structure.—*Zement,* vol. 28, no. 37, (Sept. 14, 1939), pp. 563-569.

Brown Coal-Bearing Sands in Concrete

Schade reports on investigations made to determine the suitability of brown coal-bearing sands for the production of concrete. He concludes, on the basis of his test conditions, that quantities of brown coal up to 1 per cent., as found in the particular sand pit described, have, *practically,* no influence upon the strength of concrete, unless they may show disadvantages in freezing-and-thawing tests to be reported later.—*Zement,* vol. 28, no. 44 (Nov. 2, 1939), pp. 640-641.

Hardening of Magnesite Without Chloride

In *Tonindustrie-Zeitung* vol. 62 (1938) no. 62, p. 1017, D. V. Rodt showed that burned magnesite made plastic with water converts but slowly to magnesium hydroxide, even if this conversion is very far-reaching during a long period. He showed furthermore that there is also but a slow solidification of the paste. At that time it was pointed out that the transition of the burned magnesite to magnesium hydroxide can be accelerated exceptionally without the addition of magnesium chloride or of other soluble salts. This matter is now discussed in more detail.

The acceleration of the velocity of reaction by increasing the temperature, which is to be examined also in this procedure, is a universal phenomenon. The paste is to be warmed in a steam-saturated space, so that the water in the paste will not evaporate under the influence of the higher temperature. It is not feasible to simplify the procedure by placing the body in water and heating it; although the paste would harden even then, it would fall apart.

(The method of handling the paste for obtaining the formation of magnesium hydroxide and the hardening at higher temperature is then described.)

A Greek magnesite used contained in a state free of loss on ignition 4.38 insoluble parts (free sand and some clay), 1.11 soluble silicic acid, traces of alumina and iron oxide, 0.57 lime (CaO) and 95.50 magnesia (as residue). A Silesian magnesite used contained in a state free of loss on ignition 4.20 insoluble parts (free sand and some clay), 0.54 soluble silicic acid, 0.25 alumina and iron oxide, 1.52 lime (CaO) and 95.30 magnesia (as residue).

Tests were conducted at room temperature, and also at a temperature of 70 degrees C. in a steam chamber. Both samples showed in the room temperature and also in the steam chamber temperature that the volume of water used in making the paste does not influence the conversion unless it is abnormally large. At the room temperature both samples showed during the first 24 to 28 hours only at first a greater conversion to hydrate, which after a few hours continued to increase but very slowly, and no distinct hardening was evident. When placed in the steam chamber at about 70 degrees C., both samples showed a very much more rapid conversion to magnesium hydroxide, combined with a rapid hardening of the paste, the Silesian magnesite

being somewhat slower in conversion.

Only a corresponding solidity test can show whether the hardening stands in regular relationship to the conversion to magnesium hydroxide and is to be traced to this formation, or whether the hardening is based upon topochemical processes. — *Tonindustrie-Zeitung*, vol. 63 no. 87 (Nov. 20, 1938), pp. 914-915.

Comparative Tests on Highway Cements

Otto Graf presents tabulated results of comparative tests on highway cements conducted in the laboratory and in the field (Reichsautobahn test section).—*Zement*, vol. 28, no. 29 (July 20, 1939), pp. 445-450; no. 30, pp. 461-466; no. 31, pp. 475-480; no. 32, pp. 491-495; no. 33, pp. 505-511.

Procedure in Analysis of Building Lime

A proposed standard is presented covering the procedure in analyzing building lime, to be issued by the German Standards Committee as a standard. The paper covers sampling, list of solutions and reagents, and procedure for the analysis of lime.—*Zement*, vol. 28, no. 34 (Aug. 24, 1939), pp. 521-524.

Innovations in the Burning of Cement

H. Jordan describes innovations made in the burning of cement, as covered by German Reich patents issued in the years 1937 and 1938. The treatment of raw cement material prior to burning is covered by half a dozen patents which are described and illustrated. The cooling of cement clinker is covered by three patents also described and illustrated. A lining for rotary kilns is featured also.—*Zement*, vol. 28, no. 34 (Aug. 24, 1939), pp. 524-528; no. 35, pp. 540-542.

Producing Lime at Low Finishing Temperatures

Carl Roedl makes an interesting contribution to the problem, whether the burning of dolomitic limes at low temperatures can be carried through in normal lime-plant operation. Normal dolomite consists of 54.3 per cent. $CaCO_3$ + 47.7 per cent. $MgCO_3$. An analysis of a dolomite and results of strength tests are presented. — *Tonindustrie-Zeitung*, vol. 63, no. 63 (Aug. 7, 1939), pp. 719-720.

Simplified Calculation of Waste Kiln Gases

E. Rock has prepared a series of 5 tables and a chart to simplify calculations in the design of parts of cement kiln plants, as, for example, waste-gas ducts, fans, flues, etc. The values in these tables may form a basis also for the heat calculation of rotary and shaft kilns and for the dimensioning of dust chambers, waste-heat boilers, etc.—*Tonindustrie-Zeitung*, vol. 63, no. 79 (Oct. 10, 1939), pp. 861-863.

Behavior Vitreous Slags Toward Ammonium

Fr. Keil and Fr. Gille present from the research institute of the German Association of Iron Portland Cement Works, a general survey of research concerning the behavior of vitreous slags toward ammonium and amic salts of organic acids. It is concluded:

1. In reference to weak alkali and weak acid solutions of ammonium acetate, of ammonium citrate, and of amic citrates, the individual oxides of the vitreous slags dissolve faster or slower, in extreme cases completely or not at all in solutions of definite pH values.

2. The individual kinds of crystals of the cement clinker are attacked by the same solutions in very different ways. It is possible to separate crystallized MgO besides amorphous silicic acid (from the residue of lime silicate) and determine it Roentgenographically. The

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separation of ferrite aluminate is also possible in this manner.

3. Upon the basis of these solubility differences it is possible to separate in non-hydrated condition:

alumina cement from blast-furnace slag

alumina cement from cement clinker

cement clinker from blast-furnace slag.

From a mixture of cement clinker blast-furnace slag and vitreous alumina cement can be separated: by chemical methods blast-furnace slag in the alkali field (pH of about 12), vitreous-alumina cement in the acid field (pH of about 5). This is as important for the qualitative examination as for the quantitative determination of the constituents of cements. Further details are to be presented upon conclusion of the entire work.—*Zement* vol. 28, no. 28 (July 13, 1939), pp. 429-434.

Influence of Sulphate on Shrinkage of Cement

According to a paper delivered by Dr. G. Haegermann at the summer meeting of the Association of German Portland Cement Manufacturers in Vienna on September 12 and 13, 1939, it has been acknowledged, on the basis of research concerning the relation between the chemical composition of clinker and the shrinkage of cements ground from it that, at the same fineness of grinding and with the same addition of gypsum, Portland cements fat in alumina show a greater degree of shrinkage than those lean in alumina; in other words, that the alumina-fat cements are more unfavorable than the iron oxide-fat cements as to shrinkage.

Many data are presented, including 8 charts and 14 tables, some of them covering previously published material. Eventually in the research five cements were obtained from the trade and the influence of additions of sulphate upon their most important properties was determined systematically. Calculated by Bogue's formula, these 5 cements contained in percentage the following most important clinker components (based on calcined cement):

Cement	A	B	C	D	E
$3CaO \cdot SiO_2$	55%	66%	55%	56%	63%
$2CaO \cdot SiO_2$	23	12	23	12	14
$3CaO \cdot Al_2O_3$	15	12	9	1	0
$4CaO \cdot Al_2O_3 \cdot Fe_2O_3$	3	6	8	24	19
$2CaO \cdot Fe_2O_3$	0	0	0	0	0.2

From these investigations it can be deduced that gypsum, when applied in the correct quantity, belongs in first place in total evaluation. Magnesium sulphate does not influence, or not noticeably unfavorably, the strength of cements having high alumina moduli; but as the alumina modulus decreases an increasing unfavorable effect appears. The relations in reference to shrinkage are similar, the shrinkage rate being reduced in cements with high alumina moduli but increased in cements with low alumina moduli. The influence of the alkali sulphates is characterized particularly by the strong decrease of the initial shrinkage, but the subsequent shrinkage is comparatively stronger than with gypsum. The favorable effect is greater in cements with high alumina moduli than in those with low alumina moduli. In cements fat in iron oxide the shrinkage is influenced unfavorably rather than favorably by alkali sulphates. The tensile strength is not essentially changed by the alkali sulphates, but the compressive strength is reduced considerably. The alkali bisulphates behave much as do the alkali sulphates. Ferro sulphate is marked in particular by its strong retarding of the setting-time relations; while the strengths were influenced but little, there was in every case an increase in initial shrinkage.

The results of the investigations are proof of the strong influence, both favorable and unfavorable, of sulphate additions on the amount of shrinkage. Accurate regulation of the addition of gypsum is therefore to be recommended. In cements with average alumina contents, the SO_3 content should not be less than 1.4 per cent, and a mere favorable influence upon the properties can be expected if the SO_3 content is higher, the most favorable quantity to be determined by tests in the plant.

Based on tests in the plant applied to Portland cements having more than 5 per cent residue on the 4,900-mesh screen, 3.5 to 4 per cent gypsum ($CaSO_4 \cdot 2H_2O$) can be designated as the most favorable quantity to be added, which, however, exceeds the 3 per cent limit set up by the standards. Therefore the question of changing the standards should be considered seriously; for example, in the sense that the limit for the SO_3 content is retained and the quantity of gypsum is made dependent upon the admissable SO_3 content of 2.5 per cent. However, special determination should be given for other additives, as, for example, calcium chloride.—*Zement,* vol. 28, no. 40 (Oct. 5, 1939), pp. 599-602; no. 41 (Oct. 12, 1939), pp. 609-614.

TRAFFIC NEWS DIGEST

Lime.—Examiner George Esch has recommended in a proposed report in No. 27,469, Virginia Lime Products Company, Inc., *v.* Chesapeake & Ohio, on further hearing that the commission revise its findings in the prior report, 226 I.C.C. 193, as to the rates and minimum weights on chemical lime from Eagle Mountain, Virginia, to Charleston and South Charleston, West Virginia. In the prior report Division 3 found that a rate of $3.02 a net ton, minimum 30,000 pounds, in effect prior to April 3, 1936, was not unreasonable; and that rates of $2.80, minimum 30,000 pounds, and $2.20 minimum 50,000 pounds. established April 3, 1936, were not unreasonable.

The report said the failure of the railroad to establish on that date a rate, subject to a minimum of 70,000 pounds, not in excess of 70 per cent of the rate established on that same date subject to a minimum of 30,000 pounds, was unreasonable. Reparation was awarded on shipments made on and after April 3, 1936, on which the charges by the car were higher than those that would accrue under those findings.

The complainant and the railroad were not satisfied with that. On their petitions the proceeding was opened for further hearing in its entirety. Thirty-five railroads intervened in opposition on account of their hauling of the traffic in question in trunkline and central territories. The rates under attack, from Eagle Mountain to Charleston and South Charleston, were local to the Chesapeake & Ohio. Being border points as to central and trunk line territories the railroads not named as defendants had an interest in them.

Examiner Esch, after reviewing a number of general lime cases, said the commission should find the rate of $3.02, minimum 30,000 pounds, in effect prior to April 3, 1936, was unreasonable to the extent that it exceeded $2.90, under a minimum of 30,000 pounds; that the rate of $2.80, minimum 30,000 pounds, and $2.20, minimum 50,000 pounds, which were established April 3, 1936, were and are not unreasonable; and that the defendant's failure to establish the 70 per cent. basis on April 3, 1936, was not and is not unreasonable. He said the prior report should be modified accordingly and the order requir-

ing the establishment of the 70 per cent. basis should be vacated, and he also recommended an award of reparation on the basis proposed by him.

Chalk Whiting.—Examiner O. L. Mohundro, in a proposed report in reopened No. 27, 921, Southwark Manufacturing Company *v.* Pennsylvania, *et al.* and cases joined with it, has recommended that the commission affirm findings made in the prior report, 231 I.C.C. 755. A reasonable and non-prejudicial basis of rates was recommended. The case deals with intrastate rates on chalk whiting in New Jersey.

Sixteen sub-numbers are listed along with the title complaint. They are the complainants of customers of the title-case complainant. The title complainant is a manufacturer of whiting made from ground chalk. He and the complainants in the sub-numbers alleged that chalk was a ground limestone, and the rates charged on chalk whiting from Camden, New Jersey, to destinations in official and southern territories were unreasonable, unjustly discriminatory and unduly preferential of competitors shipping ground limestone which, it said, was sometimes called whiting substitute.

In addition to the sub-numbers the report embraces No. 27,612, Intrastate Rates on Whiting in New Jersey, a thirteenth section proceeding, and No. 25,220, American Lime & Stone Company *v.* Pennsylvania together with proceedings listed in the footnote on the first page of the original report therein, 201 I.C.C. 467. In the original report findings of unreasonableness and undue prejudice were made. The examiner said that, in the light of the rehearing, the commission should affirm its findings. Additional findings and recommendations were made to the commission by Examiner Mohundro.

Fourth-Section Applications.—Docket 18300 was filed by B. T. Jones requesting fourth-section relief to establish rates on sand, gravel and crushed stone in carloads from points in Illinois to Michigan City, Indiana, to meet market and water-truck competition.

Docket 18304 was filed by L. E. Kipp requesting fourth-section relief to establish rates on mortar and masonry cement in carloads from, to and between points in western trunk-line territory, an analogous commodity being the grounds for relief.

Docket 18305 was filed by S. A. L. in requesting fourth-section relief to establish rates on cement in carloads from points in the Birmingham, Alabama, group to Columbus, Fort Benning Junction and Ochillee, Georgia, circuitous routes being the grounds for relief.

Sixth-Section Applications.—F. D. Miller, agent, No. 4801. To publish reduced rates on gravel from Gravelton, North Carolina, to various South Carolina points.—I.C.C. 489. (748578)

J. R. Peel, agent, No. 3770. To publish revised rates on crude barytee ore and rock from Arkansas points to Louisiana and Texas gulf ports.—I.C.C. various. (748775)

Public Service Company of Indiana: To cancel rates on cement from Speed, Indiana, to Owensboro, Kentucky, correcting error.—I.C.C. 40. (751249)

Chicago & Northwestern, No. 1061. To advance the effective date of revised rates on sand and gravel from Lyman-Richie pit, Nebraska, to various Iowa points.—I.C.C. 10857. (750821)

Fourth-Section Orders.—Docket 9761 (supplemental)—Lime from Crisfield, Maryland. Application 18151 as amended. Filed by J. G. Kerr for and on behalf of carriers parties to F. D. Miller's I.C.C. 12 and 248. Fourth-Section Order 9761 entered March 13, 1928, in Application 13313 modified and amended so that the relief authorized therein with respect to rates on lime on the bases of distance scales plus arbitraries to individual destinations shall also apply to rates constructed in the same

A PAGE WALKING DRAGLINE will do the job in record time!

Diesel or electric powered Draglines
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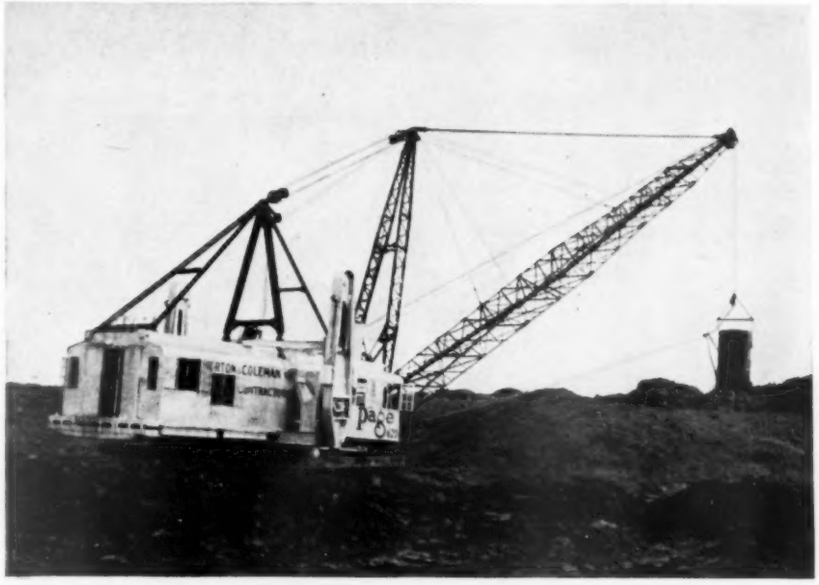

Horton & Coleman used this Page Walker on levee work near Pine Bluff, Arkansas. The machine has a 120-foot boom and used a light-weight 5-cubic-yard Page Bucket.

Page Walkers are fast dragline machines that are establishing new yardage and profit records for their owners.

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manner from the same origins to basing points in southern territory named in Agent F. D. Miller's Tariff I.C.C. 200, the rates so made to apply to all points grouped therewith as proposed in Fourth-Section Application 18151, the additional relief thus authorized to be subject to the terms and conditions of the original order as amended, except that in complying with such terms and conditions, distances to destination basing points may be used in lieu of distances to individual points. (Order March 7.)

Docket 10677 (2nd supplemental). Lime from Watauga, Tennessee; Leeds, North Birmingham and Phoenixville, Alabama. Application 18151 as amended. Filed by J. G. Kerr for and on behalf of carriers parties to F. D. Miller's I.C.C. 12 and 248. Fourth-Section Order 10677 entered July 30, 1931, in Application 14376 as amended by supplemental order dated August 26, 1939, entered therein and in Application 17980 further modified and amended so that the relief authorized therein with respect to the rates on lime on the bases of distance scales from origins or groups of orgins to individual destinations shall also apply to rates constructed in the same manner from the same origins to basing points in southern territory named in Agent F. D. Miller's Tariff I.C.C. 200, rates so made to apply to all points grouped therewith as proposed in Fourth-Section Application 18151, the additional relief thus authorized to be subject to the terms and conditions of the original order as amended, except that in complying with such terms and conditions distances to destination basing points may be used in lieu of distances to individual points. (Order March 7.)

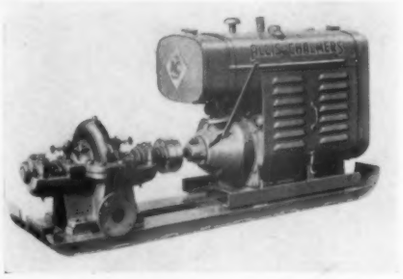
Docket 11543 (2nd supplemental). Lime from Portland, Georgia, and Ragland, Alabama. Application 18151 as amended. Filed by J. G. Kerr for and on behalf of carriers parties to F. D. Miller's I.C.C. 12 and 248. Fourth-Section Order 11543 entered April 6, 1934, in Lime from Portland, Georgia, and Ragland, Alabama, 200 I.C.C. 506 as amended by supplemental order dated Jan. 6, 1940, entered therein and in Application 18156 further modified and amended so that the relief authorized therein with respect to rates on lime constructed on the bases of distance scales from origins or groups of origins to individual destinations shall also apply to rates constructed in the same manner from the same origins to basing points in Southern territory named in Agent F. D. Miller's Tariff I.C.C. 200, the rates so made to apply to all points grouped therewith as proposed in Application 18151, the additional relief thus authorized to be subject to the terms and conditions of the original order as amended, except that in complying with such terms and conditions distances to destination basing points may be used in lieu of distances to individual points. (Order March 7.)

NEW MACHINERY AND SUPPLIES

• Pumping Unit

To provide independently powered pumps for gravel-washing plants and similar applications the Allis-Chalmers Manufacturing Company has introduced a line of centrifugal pumps driven by gasoline-power units. Since these units are entirely independent of any outside source of power, municipal and private water suppliers use them as standby units in emergencies when other sources of power fail.

Power units in five sizes (18 to 110 horsepower) assure economy in operation with a



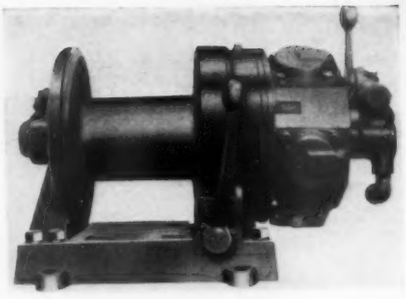
Gasoline-engine-powered pumping unit.

choice of fuels: gasoline, kerosene, distillate, natural gas, or butane. All power units have valve-in-head medium speed engines, with removable cylinder liners, efficient cooling systems, force feed lubrication and a variable speed governor.

The centrifugal pumps are horizontal shaft, single-stage, single or double-suction pumps designed for handling liquids at normal temperatures with maximum efficiency. To facilitate handling, the engines and pumps are mounted on a base and are available in many combinations to meet various requirements in quantity and pressure up to 5,000 gallons per minute and 100 foot head.

• Air-Powered Hoist

"Smoother torque than a straight 8" is what Gardner-Denver officials say about the five-cylinder radial air-motor used to power the company's new line of single- and double-drum air hoists. The overlap of power impulses of this motor exceeds that of a modern 8-cylinder automobile engine. Engineers report that a low speeds, when the flywheel action is negligible, its smooth action is particularly noticeable. Although the motor is new in use on air hoists, it has been proved in use on Gardner-Denver mine-car loaders.



Air-motor-driven hoist.

As described in Gardner-Denver Bulletin H-1, the new hoists have smaller overall dimensions and less weight per horsepower delivered than any other hoists of their type. They are very well adapted to hoisting, hauling, dragging or scraping in pits, quarries, mines, smelters, and on highway and construction work. Other features which distinguish these hoists are safety design which makes it impossible to drop a load accidentally; powerful brake bands with conveniently located operating lever; hardened gears accurately cut and running in oil; entirely sealed gear train that absolutely prevents dirt and water from reaching any gears or bearings; sealed-in oiling system that insures proper lubrication without the need for constant watchfulness on the part of the operator; 3 simple points of lubrication takes care of all moving parts; throttle lever is self-centering with automatic safety ledge to hold it in neutral position.

• Air Cleaner

The Logan Engineering Company, Chicago, announces that its line of Aridifiers for removing moisture and oil from air and gas lines is now complete in all sizes from ⅜ to 10 inches.

Device for removing oil and moisture from air-lines.

PERFORATED METAL SCREENS
FOR SAND, GRAVEL STONE, ETC.
Manufactured exactly to your specifications.
Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices.
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Telephone CANAL 1459

All sizes effectively remove dirt, scale, oil and moisture from compressed air and gas lines, foreign matter impinging on a multiplicity of "propeller blades" revolving in opposite directions and propelled by the flow of air or gas. The arrested contamination and moisture is collected in the lower housing from where it is drawn off as occasion warrants.

All sizes are simply constructed, easy to install in any line, interior or exterior, operate without back pressure and require no maintenance or attention other than a periodical clean-out.

These units are designed for application to compressed air lines in quarries to protect the internal mechanism of drills, jack hammers and other air operated and actuated equipment against rock dust, moisture and oil.

• Generator Unit

"Powr-Pak," a new line of Diesel-electric power plants, ranging in size from 3,600 to 24,000 watts and built to a simple, yet revolutionary space-saving design, is being placed on the market by Lister-Blackstone, Inc., Milwaukee.

These new plants consist of a radiator-cooled engine, generator and control panel, all assembled in compact form ready to set in place

Diesel-electric generator unit.

and put to work. Chief change from conventional design is in the placement of the generator, which sets directly underneath the engine and thus cuts floor space requirements almost in half.

Power for generating is supplied by the Lister 4-cycle Diesel engine using the Bosch fuel system. To assure long engine life, the cylinder walls are chromium impregnated by the "Listard" process. The patented dual-compression system makes starting by hand easy under all temperature conditions, without the use of punks, glow plugs, or any other preheating devices, the manufacturers say.

Generators are available in any desired voltage or current, either d.c. or single or three phase a.c., for stationary or marine service.

• Scraper

Gar Wood Industries, Inc., Detroit, has placed a new, low-priced, dirt-moving, utility scraper on the market. The new model 23 Gar Wood-Continental, 3-cubic yard, 2-wheel,

"LOAD LUGGER make Hand Loading PAY"

He's right, too, as shown by the experience of quarry operators, road builders, aggregate producers, construction men and contractors who are able to save 50% or more on their material handling costs with the Load Lugger and a set of dump buckets. It is a good way to keep a steady run of quarry rock going to the crushers. While one load is being hauled, other buckets are spotted on the job, where they are easily filled at shovel level.

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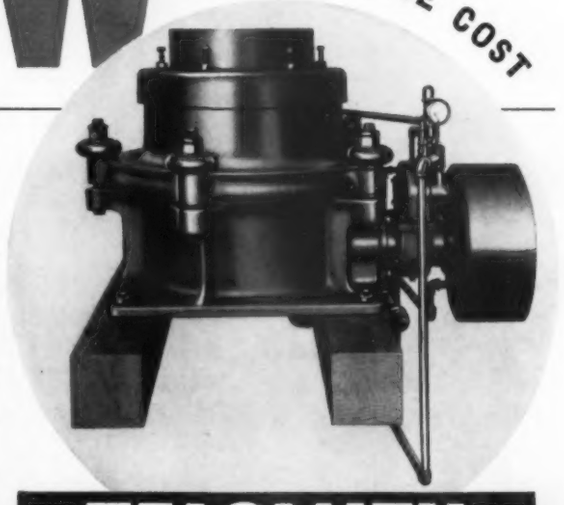

. . . and the *record low price* for one of the best crushers Telsmith has ever built . . . make Telsmith Intercone *the crusher buy of* 1940!

You'll find advanced Telsmith features in this crusher—but the price is not advanced—it's lowered. Now you can afford that secondary crusher you need. This Telsmith will make money for you right from the start.

LOOK FOR THESE FEATURES: *large capacity, wide range of fine sizes, lead bronze eccentric sleeves, force feed lubrication, steel structure, protection against tramp iron.*

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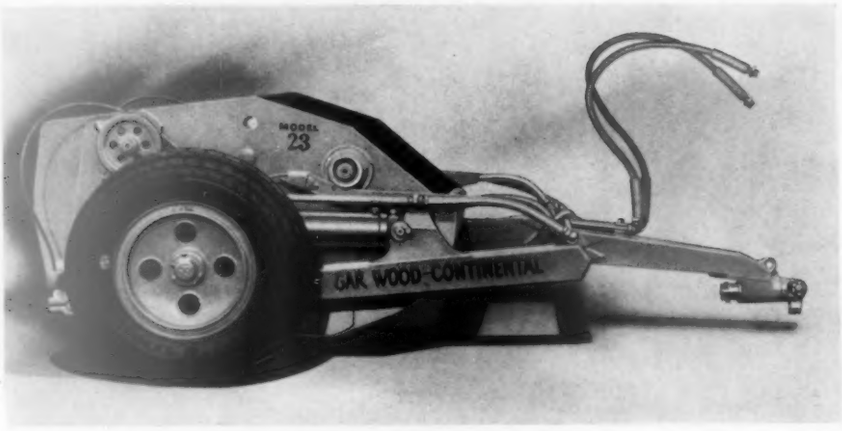


Hydraulic scraper for use with tractors.

hydraulically-operated scraper is designed specially to replace antiquated equipment such as fresnos, tumblebugs and bottomless scrapers.

Model 23 handles the many odd jobs which must be completed in fast time and at lowest operating costs. Used with Allis-Chalmers models M and WM and other tractors of similar horsepower, it digs under positive pressure in all kinds of soil, loads, hauls and back dumps and represents low investment per cubic yard of dirt-moving capacity. Raising and lowering of the cutting blade, closing the load and dumping are accomplished while in motion. Twin, two-way-action hydraulic jacks actuate the digging bucket and provide accurate and fast control by the tractor operator of all digging, loading and carrying operations.

• Lubricator

A portable lubricating unit known as Pressurelube is instantly adjustable to deliver grease at from 1,000 to 12,000 pounds pressure, thereby facilitating lubrication of shackles on heavily-loaded trucks and trailers without the added inconvenience of loss of time and of resorting to a pinch bar. A particularly outstanding feature of the unit is its 40,000-pound pressure hose, in which the pressure of the machine is developed.

Power is supplied by a 23-plate standard storage battery which drives a starting motor and worm and gear. The battery has the capacity to deliver 5,030 discharges at 2,000 pounds pressure before recharging is required. A. G. E. Tungar charger operating off an alternating current line is self-contained in the unit. The unit affords complete portability in that no air hoses or electric cords are required for its operation.

A pressure indicator is easily adjusted to any required pressure from 1,000 to 12,000 pounds. The unit, being equipped with pneumatic tires, requires no effort to pull around to wherever lubrication is needed.

The unit is built in two models, with either single or double container. By means of a heavy follow-up plate on the heavy container side, it is possible to pump with ease the heavy fibrous greases of the major oil companies. These heavy greases are pumped at the same pressure as lighter chassis lubricants and they flow as readily.

Pacific Pressurelube, Inc., San Francisco, is the western representative.

Portable pressure-lubricating equipment.

• Pre-Cooler

The Zonax pre-cooler, one of the newer F. L. Smidth & Company products, is an integral cooler consisting of a system of grate castings mounted inside the kiln at the discharge end and through which cooling air from a fan is introduced for rapid cooling of the clinker passing over the grates. This cooler is particularly suited for installation on existing rotary kilns.

The Zonax pre-cooler is located at a point between the lower tire and the discharge end of the kiln, and consists of a number of heat-resistant steel sectors arranged annularly inside the kiln shell in transverse rows, the kiln shell being provided with one opening in connection with each sector compartment of the transverse row.

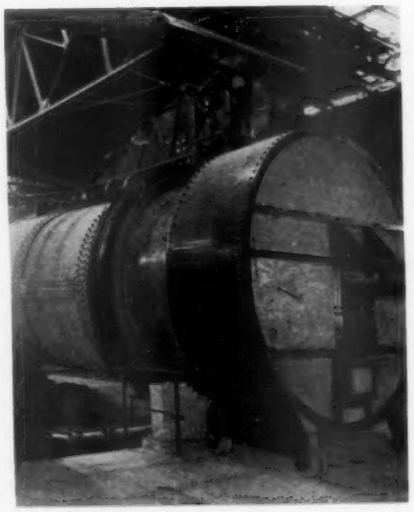
A stationary, air-distributing casing surrounds the kiln, being carried on rollers riding in rings fastened to the kiln, which rings also form part of an effective air seal arrangement. The position of the mantle is adjustable for a certain amount in either direction from its central position.

A supply of air into the sector compartments which correspond to the sector submerged in the clinker layer is controlled by means of two blocks fastened to the outside wall of the stationary mantle.

Another recent F. L. Smidth development is the Ex-or pneumatic raw-material feeder for dry pulverized material.

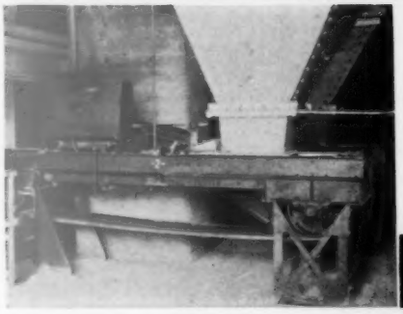
The design of this feeding device is based on the fact that pulverulent material when aërated by means of a small amount of compressed air and at the same time agitated by mechanical means will behave like a fluid. When means are provided for maintaining a constant level of such a fluid in the tank, uniformity in the flow of the material through the opening in the bottom of the tank is assured.

The Ex-or feeder consists essentially of a pneumatic extracting device, a constant-level



Pre-cooler installed on rotary cement kiln.

This is the Dual Purpose WEIGHING MACHINE • MERRICK FEEDOWEIGHT



Feedoweight combines in a single unit a conveyor type feeder and scale.
It automatically feeds the material by weight and accurately totals and registers the amounts.
Precision is assured by power-operated feed and control gate.
Feeds two or more materials in correct proportions by batch or continuous method.
Write for Information

Merrick Scale Mfg. Co.
Passaic, New Jersey

feeding tank provided with means for air and mechanical agitation, pneumatically-regulated positive-acting valve mechanism and a level controller.

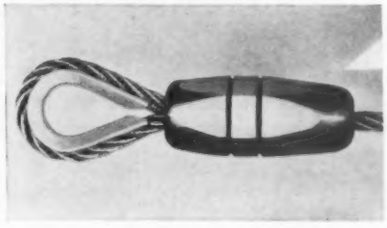
The extracting device extracts and aërates the pulverized material from the storage bin and this device is arranged for connection to the bottom of the raw-material storage bin.

The constant-level feeding tank is provided with a special discharge opening at the bottom with a slide gate complete with dial. By adjusting the position of this gate the rate of flow of material from the tank may be regulated corresponding to any desired rate of feeding of the material.

The pneumatically-regulated valve mechanism, automatically controls the raw-material flow from the extractor to the feeding tank.

• Rope Clamp

The "Safe-Line" wire-rope clamp, described in the December, 1939, issue of PIT AND QUARRY, has been granted the approval of the Underwriters' Laboratories for use on the strongest of wire ropes. It is claimed by the manufacturers of the "Safe-Line" clamp,



The "safe-line" clamp.

the National Production Company of Detroit, that an approval of this sort has never before been obtainable where a clamp is used to form and hold a loop.

The tests necessary to obtain approval were quite exhaustive and consisted of both tension and vibration tests of numerous sets of samples.

These samples were assembled by both the Laboratory employees and the manufacturer, and the ease of assembly was commented upon in the summary of the report. The shielding of the sharp ends of the wire rope to prevent personal injury is quite obvious and allows free and safe handling of the rope.

• Pipe-Lining Cement

U. S. Patent No. 2,182,714 on pipe-lining cement has been issued recently to J. C. Witt. As stated in the specification, "pipe-lining cements have heretofore been made by compounding materials readily obtainable and having established well-known uses. The present invention aims to produce an improved cement for like purposes by mixing blast-furnace slag with a special Portland-cement clinker having certain desired characteristics. More particularly, the present cement is produced by compounding blast-furnace slag and special Portland-cement clinker in proper proportions with sufficient gypsum for controlling the set of the final product. The slag, special cement clinker and gypsum are then ground together to approximately 200-mesh fineness. The special clinker was chosen from approximately ninety experimental burns primarily on the basis of its low solubility in water."

The new cement is highly resistant to water and to the substances that may be present in natural waters, such as sulphates. While it was developed for the lining of pipes and tanks, it seems likely that many additional uses for it will be found.

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DRAGLINES
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A REVIEW OF RECENT BOOKS

GEOLOGY AND ENGINEERING, *by Robert F. Legget, assistant professor of civil engineering, University of Toronto. Published by the McGraw-Hill Book Company, 330 West 42nd Street, New York. Price $4.50.*

Written from the practical, engineering point of view, this important book presents a review of the application of the science of geology to the whole field of civil engineering. The work is unique in that it is the work of an engineer with the additional training of a geologist, providing a well-balanced background of essential knowledge.

It is well known that adequate geological investigation of natural conditions in engineering undertakings in the past would have resulted in the saving of human life by the prevention of disasters; it has frequently been the means of effecting a considerable reduction in the cost of engineering works and of avoiding the trouble and expense of litigation. Among engineers, especially, the volume will fill a long-felt want.

PRINCIPLES OF MINERAL DRESSING, *by A. M. Gaudin, professor, Massachusetts Institute of Technology. Published by McGraw-Hill Book Company, 330 West 42nd Street, New York. Price $4.50.*

A study of mineral dressing from the unit-process standpoint, analyzing each process in turn on the basis of its physical and chemical principles, yet keeping the ultimate objectives of the art and its philosophy in view. Because of the unparalleled changes in the art of mineral dressing in the past 30 years, the author has modified the traditional treatment of his subject to emphasize principles and to minimize machine descriptions, details of practice, and discussion of auxiliary operations. Contains a chapter on flocculation and dispersion, much new material on the philosophy of grinding and crushing, the mechanics of solids moving in fluids, jigging and tabling, and magnetic separation. There are numerous references for further reading, and many illustrations.

TURNING POINTS IN BUSINESS CYCLES, *by Leonard P. Ayres. Published by the Macmillan Company, New York. Price $2.75.*

The author, who also wrote *Economics of Recovery,* tells how and why business activity turns downward from prosperity to depression and later upward again to new prosperity. Traces the course of American business since 1830 with the aid of 25 diagrams and numerous tables. The book includes thorough discussions of previous theories of the causes of business cycles. The author's conclusions have been greatly aided by the use of an entirely new series of data reflecting the monthly changes during a 75-year period in the volume of inflow or new capital into productive enterprise. Business cycles are as old as the industrial era. They are our most serious political problems. This book shows how they work and what causes them.

STANDARD CHEMICAL AND TECHNICAL DICTIONARY, *edited by H. Bennet. Published by Chemical Publishing Company, New York. Price $10.00.*

A condensed technical word-book for technicians, engineers and others who need assistance in keeping up with the many chemical, physical, mathematical, engineering and technical words of expression. It is a compilation, with 25,000 definitions, completely covering industrial products, chemicals and trade names, abbreviations, contractions, symbols, etc.

Every device has been used to make the dictionary one that is practical to use. Material of a similar nature is grouped together and cross-references are complete.

Trade Literature

Worthington Balanced-Angle Two-Cylinder Air Compressors (6 pages). *Rock Master Drill* (leaflet). *No. 180 Pneumatic-Feed Drifter* (folder). Worthington Pump & Machinery Corporation, Harrison, New Jersey.

Instruments for Testing Cement, Soils and Petroleum (164 pages). American Instrument Company, Silver Spring, Maryland.

The 1940 LeTourneau Line (32 pages). R. G. LeTourneau, Inc., Peoria, Illinois.

Engine-Driven Centrifugal Pumps (4 pages). Allis-Chalmers Manufacturing Company, Milwaukee.

Mixing Plants for Bituminous Construction (loose-leaf catalog). Iowa Manufacturing Company, Cedar Rapids, Iowa.

Cars—Truck Bodies—Trailers—Semi-Trailers (48 pages). Easton Car & Construction Company, Easton, Pennsylvania.

Champion Portable Conveyor (4 pages). Trowbridge Conveyor Company, Clifton, New Jersey.

Canton Industrial Stokers (8 pages). Canton Stoker Corporation, Canton, Ohio.

Hardinge Constant Weight Feeder (4 pages). Hardinge Company, York, Pennsylvania.

Ten Koehring Diesel-powered Highway Model Wheelers started on March 7 on what was probably the longest overland journey ever attempted by tractor-drawn scraper equipment. Rolling on 60 pneumatic tires valued at approximately $20,000, the fleet left the Parsons assembly plant of the Koehring Company at Newton, Iowa, for a trip of approximately 800 miles over public highways. Its destination was Lamar, Colorado, where the scrapers went into operation on a Santa Fe relocation project around the site of Caddoa Dam.

The CONCRETE MANUFACTURER

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The CONCRETE MANUFACTURER

April, 1940

A SPECIAL SECTION OF PIT AND QUARRY DEVOTED TO PRODUCTION MARKETING AND USES OF CONCRETE PRODUCTS AND READY-MIXED CONCRETE

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Erects New Brick Plant

A plant for the manufacture of lime-cement bricks using pumice as the aggregate, is being established at Pittsburg, California, by the California Pumice Company.

Operations will be in charge of C. Geist. The new venture entails an investment of about $50,000, according to reports.

■

Adds Plant Improvements

A number of improvements have been made at the ready-mixed-concrete operations of the Grand Rapids Gravel Company at Grand Rapids, Michigan.

A new office building is now in use, heating equipment was installed during the winter and three new truck-mixers have been added to the fleet, making a total of eight. Henry Battjes is president.

■

Mooney Succeeds Potts

The appointment of T. G. Mooney to assist C. F. Miller in the management of production, promotion, and sale of Pottsco lightweight concrete agrgegate, a Celotex product, has been announced. Mr. Mooney replaces Harry H. Potts, resigned.

Mr. Mooney has been associated with the Pozzorite Corporation, a subsidiary of The Celotex Corporation, for the past year. He brings to his new activities wide experience in the concrete industry and with aggregates. He is well known to the concrete industries as a result of his ten years' work on the American Society for Testing Materials Committee, C-9, with which rests the important responsibility of writing the specifications for concrete and concrete aggregate. Much of this time was spent in special sub-committee work on aggregates, permeability, and admixtures.

Before joining the Celotex Corporation, Mr. Mooney managed the technical and service department of the North American Cement Corporation.

The work of replacing sand bags with concrete blocks for air-raid protection is proceeding rapidly in London. The photograph above shows one such revetment being erected outside a factory building.

Concrete blocks are handled rapidly and at low cost in the plant of the D. J. Kennedy Company at Pittsburgh with the gasoline-powered lift-truck shown above. The photograph at the left shows the operator deftly removing a load of 60 units from the under-cover storage with the Clark Carloader and, right, placing it on the bed of a truck for delivery. Six loads —360 blocks—fill the truck, one man doing the job in 12 or 15 minutes. By the hand method it used to take three men 40 to 45 minutes to do the same work.

Ready-Mixed Concrete, Products Discussed at A. C. I. Convention

WITH nearly 500 persons in attendance, the American Concrete Institute held its thirty-sixth annual convention at the Palmer House in Chicago on February 27, 28 and 29. While many of the papers and much of the discussion had to do with concrete and concrete research from a general engineering and technical viewpoint, ready-mixed concrete and concrete products came in for considerable attention.

Roderick B. Young of the Hydro-Electric Power Commission of Ontario was elected president for the coming year. Vice-presidents named are Admiral Ben Moreell of Washington, D. C., and Professor R. E. Davis of the University of California. Retiring president F. E. Richart of the University of Illinois presented Wason medals for the best papers of the past year to T. C. Powers of the Portland Cement Association, for a paper on bleeding of concrete, and to H. J. Gilkey, S. J. Chamberlin and R. W. Beal, of Iowa State College, for a paper on the bond developed between concrete and steel.

Several new methods for designing mixes were proposed and results of comparative tests on tamped and vibrated concrete were presented. Durability was covered by a summary of experience in frost resistance, experiments on rain penetration of walls, and a report on the resistance of silo staves. New researches included impact tests of beams and measurement of cracking tendency of concrete. Various uncompleted items of laboratory work were discussed in a committee session on research.

Specification drafts considered by the meeting included revision of the Institute's building code, recommended practice in measuring, mixing and placing concrete, and specifications and test methods for concrete silo staves. Action to adopt these was deferred pending further study.

Ready-mixed concrete practice was discussed by H. F. Thomson of the General Material Company, St. Louis, and by Alexander Foster, Jr., H. J. Knopel and H. J. Whitten, all of the Warner Company, Philadelphia. The two papers brought out the leading improvements made in ready-mix practice and its important influence in pioneering better control, making high-grade concrete available for small-size operations, and eliminating many causes of inconvenience, delay, and reduced quality with advantage alike to designer and contractor.

Discussion referred especially to the reduction in slump during the time of transport of the concrete. Test data on recession in slump are used to govern suitable addition of water at the ready-mix plant. A query from the floor as to the desirability of adding this make-up water at the point of delivery was answered by strong expressions of opinion that such procedure would destroy the assurance of control of quality now obtained.

The Foster-Knopel-Whitten paper dealt with ready-mixed operations in Philadelphia. The first ready-mixed operation in Philadelphia was a central-mixing plant with a 1 cubic yard mixer. Cement was shoveled by hand from box cars to the boot of a bucket elevator and stored in a wood-stave silo. For the batches, cement was weighed on a platform scale and aggregates were measured by volume; concrete was transported in ordinary dump trucks. From that small beginning, about 19 years ago, the industry has developed to the point where more than two-thirds of the concrete used in Philadelphia is ready-mixed.

In regard to the area of market, the weighed average haul one way over the years has ranged in Philadelphia from 3.5 to 5.5 miles. In 1939 the plants supplied more than 60 different grades of concrete.

Mr. Thomson, in his paper *The Contribution of Ready-Mixed Concrete to the Building Industry,* pointed out that when the ready-mix industry introduced control methods, such definite improvement in strength and quality of concrete resulted that operators doing job mixing endeavored to improve their practices so as to catch up and remain competitive. The average of concrete production practice in a community was vastly improved. The influence of control extended beyond the concrete operation itself. To produce uniform concrete it is necessary that the aggregates be uniform, especially in grading. The ready-mixed-operator's demand for uniform grading naturally influenced the aggregate producer to improve his own method, but as he supplies other trade as well the improvement in aggregates was passed on to others, with the result that all local concrete practice benefits.

Mr. Thomson also said that the efficient ready-mixed plant has also contributed specifically to modern methods of controlling water content. The combined result of control measures has been to offer to the ordinary building job the same method of specifying quality of concrete and of assuring such quality as is available to the builder of a major dam. Concreting proceeds faster when the ready-mixed article is used than when job mixing is relied upon. Increased speed of placing results in lower labor costs and in a general speeding up of the job.

Numerous added benefits have been offered to the contractor by ready-mixed concrete, such as convenience, eliminating noise and dirt, minimizing employment problems, facilitating work on crowded sites, and releasing the contractor's organization to concentrate on placing. More accurate estimating of costs of concrete work as well as economy in designing has followed the introduction of controlled ready-mix. Loss of aggregate on the ground, spoilage of cement and disappearance of cement stacks are eliminated.

K. F. Wendt, University of Wisconsin, and Paul Woodworth of the Portland Cement Association presented their paper on *Tests of Concrete Units Using Tamping and Vibration Molding Methods.* These tests, carried on over a long period at the University of Wisconsin, were reported at length in the December, 1939 issue of PIT AND QUARRY, pages 74-76, and readers are referred to that issue for the tests and results obtained. Briefly, the aggregates used included limestone, sand and gravel, cinders, slag and the various patented light-weights. Resistance to 100 cycles of freezing and thawing was an important part of the program. The tamped blocks were made in a heavy-duty power stripper, the vibrated blocks in a Stearns Joltcrete machine.

For equivalent yields with the same aggregate, units produced by vibration have higher early strength, absorb slightly less water and in most cases are lighter than tamped units. They also have slightly lower volume change for the same moisture change.

Present specifications of 700 p.s.i. compressive strength at 28 days and maximum absorption of 15 or 16 pounds per cubic foot of concrete are believed inadequate to insure masonry units which will be sound and durable under severe exposure. A minimum compressive strength of 1,000 p.s.i. of gross area is recommended by the authors for load bearing units as the simplest and most equitable specification for insuring reasonably satisfactory behavior under severe exposure.

Discussion of this paper was participated in by H. C. Shields, service manager of the Marquette Cement Manufacturing Company, Benjamin Wilk of

(Continued on page 79)

"PLASTICIZED" CONCRETE FINDS FAVOR WITH READY-MIXED FIRM'S CUSTOMERS

PRODUCERS of ready-mixed concrete have demonstrated their ability to manufacture a high grade of concrete more economically than this can be done on the job, provided that the length of haul is not excessive. In many localities, however, job-mixed concrete is still used for work where great strength and wear resistance are not required; for example, basements and foundations for houses, etc. Such concrete, because of its low cement content, is usually either harsh and unworkable or oversanded. Commercial producers, who have established their businesses on the basis of quality, have usually been unwilling to lower their standards enough to get this business.

The Fred Schmitt Material Company, St. Louis, one of the older and more progressive producers in this field, has solved this problem with its Plast-A-Seal copyrighted concrete. As its name implies, a plasticizer is added to the concrete and this, with a scientific and highly-developed system of concrete design and aggregate-blending and proportioning, has made possible the production of a much more workable concrete with a given cement content. In developing this plasticizer the company obtained the coöperation of the research departments of various cement companies.

The plasticizer finally found to be most satisfactory was a material which had formerly been used for other purposes and which was low in cost and available in a convenient form. Many tests were then made to determine the proper quantities to be used and their effect on the concrete made with them. These tests showed that the same strength of concrete could be obtained with a lower cement content when using the plasticizer because the higher degree of workability and better finishing qualities obtained made possible the use of a lower water-cement ratio. This has made possible the manufacture of a higher-strength concrete with the same cement content. The plasticized concrete was also found to be more impervious to moisture and to have a greater resistance to freezing and thawing and to undergo less volume change due to temperature than ordinary concrete of equal strength. The plasticized concrete was also much easier to mix and place and had a much greater resistance to segregation. Plast-A-Seal concrete is made in seven general strength grades ranging from 1,500 to 2,500 pounds for foundations and footings to from 5,000 to 6,000 pounds for concrete exposed to acid fumes or high heads of water.

It has been found that the plasticizer

Plast-A-Seal concrete being used to pave a residential street.

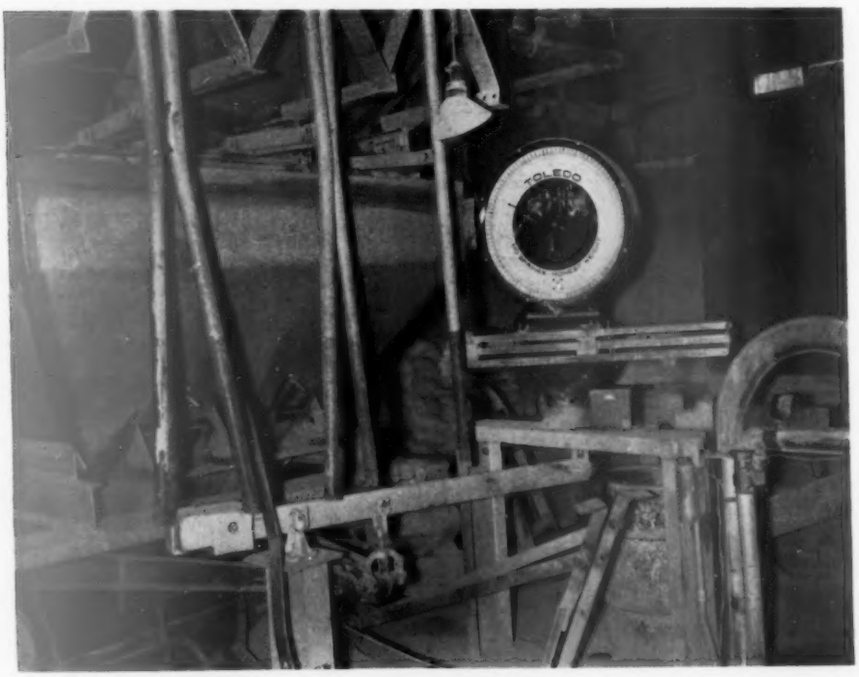
is most effective in lean mixes in preventing segregation and reducing the water-cement ratio. Laboratory tests show the following average compressive strengths on a lean mix.

	Cement	*Cement with Plasticizer*
7 days	1,085 pounds	1,575 pounds
28 days	1,675 pounds	2,275 pounds
3 months	1,830 pounds	2,590 pounds

All this concrete was mixed to the same workability. Where a plasticizer was used the water was reduced as much as 30 per cent.

In the course of these experiments it was found that the plasticity and workability of the concrete improved as the aggregate screen analysis approached the ideal. A graded aggregate is purchased and rescreened in the plant into four sizes: 1½- to 2-inch, ¾- to 1½-inch, ½- to ¾-inch, and ¼- to ½-inch. These sizes are then recombined in the desired percentages by weight for each batch of concrete. The separation and re-combination of sand fractions will be the next step. In case of a deficiency in the extreme fines a finely-divided pure silica is added.

In this plant the aggregates are unloaded from cars and elevated to a 3-deck vibrating screen which makes the 4 sizes. A two-level vibrating conveyor carries two sizes of material into bins, while the other two sizes drop into bins. Proportioning is done in a single 2½-cubic yard batcher which alternately serves two mixers. Hand-operated levers control the discharge of the aggregates into the batcher and they are weighed cumulatively on a 6-beam Toledo scale with a common dial. One beam is used for each aggregate and its counterpoise is set for the desired amount which is registered on the dial.



The aggregate-weighing batcher, scale and aggregate-control levers. At right is pneumatic chute to and from office.

When the dial moves back to 0, the process is repeated for the next aggregate. Sand and three fractions of coarse aggregate are used for most work. The fourth fraction of coarse aggregate is employed only for concrete to be used in paving. A sufficient number of screen and moisture-content tests are made to assure accurate control.

Sacked cement is dumped into a hopper from which it can be discharged into either of the mixers. Water is weighed in a 110-gallon tank with an automatic solenoid shut-off at the desired weight. The two 2½-cubic yard Concrete Transport mixers are of the horizontal type and are similar in design and construction to the truck-mixers made by this company. Concrete is discharged alternately from these mixers through a common spout into truck-mixers below.

One of the two horizontal-blade concrete mixers discharging a batch into a truck-mixer.

A fleet of 28 Concrete Transport 2-cubic yard truck-mixers is used. These deliver at the rate of about 500 cubic yards daily on average-length hauls. As the entire St. Louis area is served deliveries can be made at the rate of about 100 to 110 cubic yards per hour. On the short hauls from 800 to 900 cubic yards is delivered daily. An automatic locking device insures that each 2-cubic yard batch is mixed in the plant for not less than 2 minutes and it is agitated at slow speed all the way to the job to prevent segregation in transit.

All Plast-A-Seal concrete is sold on a guaranteed-strength basis. Regular cylinder tests are made by a private laboratory; usually two are made for each 50 cubic yards of concrete. A copy of the test report is mailed to the customer on receipt. Due to the unusually accurate methods of control used in this plant the concrete produced ranges from the designed strength to 500 pounds above it. Only at rare intervals does a cylinder break outside these limits. This is a far cry from the old days when concrete designed for 4,000-pound strength might break at anywhere from 1,500 to 7,500 pounds.

Four tickets are made out for each load. One is retained for record and three are sent with the load, one to be signed and returned and the other two to be kept by the customer. All these tickets show the strength of the concrete, the volume ordered, etc. Each is also rubber-stamped. If the customer requires additional water to be added at the job this is recorded in the stamp by the driver and the customer then assumes the responsibility. This procedure in effect means that the company guarantees the workability of its concrete as well as its strength. The handling, placing and curing are in the hands of the buyer or contractor, but the company services the jobs while they are being poured and makes suggestions on the methods of placing, etc.

As a part of its selling campaign for this product the company has published the first of a series of booklets publicizing Plast-A-Seal and its advantages. In this booklet brief information is given on the ingredients and method of manufacture and suggestions are made for its most effective use. The six fundamental characteristics of Plast-A-Seal stressed are: uniformity, plasticity, strength, durability, water-tightness, and economy.

The Fred Schmitt Material Company is an outgrowth of a contracting firm and in 1927 entered the building-material and ready-mixed-concrete fields. The open-top truck-mixer, now sold by the Concrete Transport Mixer Company, was developed at this plant. In 1936 the concrete central-mixing plant was rebuilt and enlarged. In 1939 equipment was installed for rescreening the aggregates. The production of Plast-A-Seal concrete, begun in March, 1939, now forms over 20 per cent. of the company's output and this percentage is steadily increasing.

F. Powell, sales manager, and C. J. Frein, secretary, of the Fred Schmitt Material Company, coöperated in the development of Plast-A-Seal concrete and the merchandising methods used.

A. C. I. (from page 77)

the Standard Building Products Company of Detroit, Professor M. O. Withey of the University of Wisconsin, and others. Most of these gentlemen were of the opinion that a blanket specification of 1,000-pound concrete would work a hardship on the concrete-products industry, since strengths that high are not always necessary.

Mr. Shields suggested that for exposed, load-bearing service, 1,000-pound units are often necessary but for non-exposed service, including back-up, partitions and floor fills, 700-pound block are satisfactory.

Mr. Wilk reported that the 700-pound specification has proved satisfactory to all concerned in the Detroit area. He favors 1,000-pound units "at 28-days," but not necessarily at the "time of delivery." He cited the fine record attained by sand-and-gravel aggregates in the University of Wisconsin tests, declaring the results had opened the eyes of many products manufacturers to the uniformly high performance which can be expected with this type of block when high manufacturing standards are adhered to.

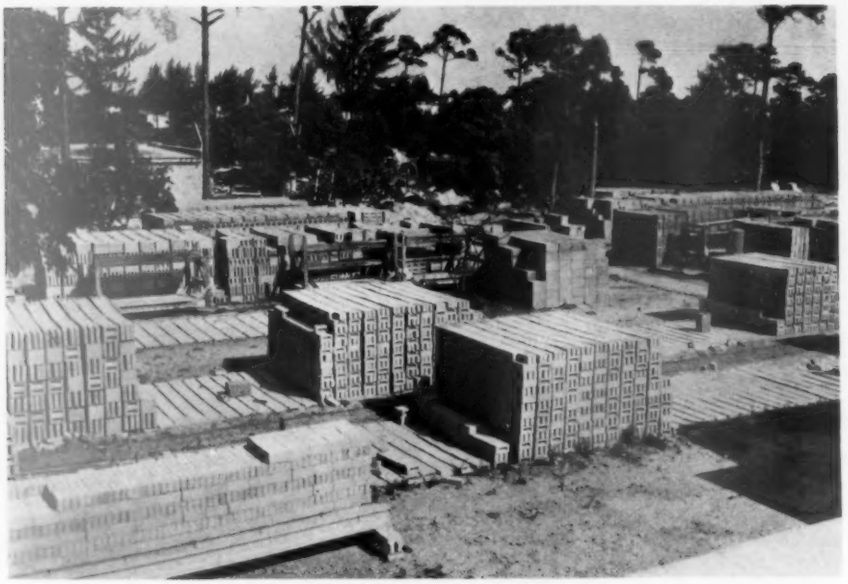
A profitable side-line for concrete-products manufacturers is offered by the Advance Fireplace & Supply Company of Detroit. The company supplies molds for the unit casting in concrete of complete fireplaces, similar to the one pictured above. Molds are said to be inexpensive and can be obtained in a variety of designs. The fire-box unit is separately cast.

The CONCRETE MANUFACTURER

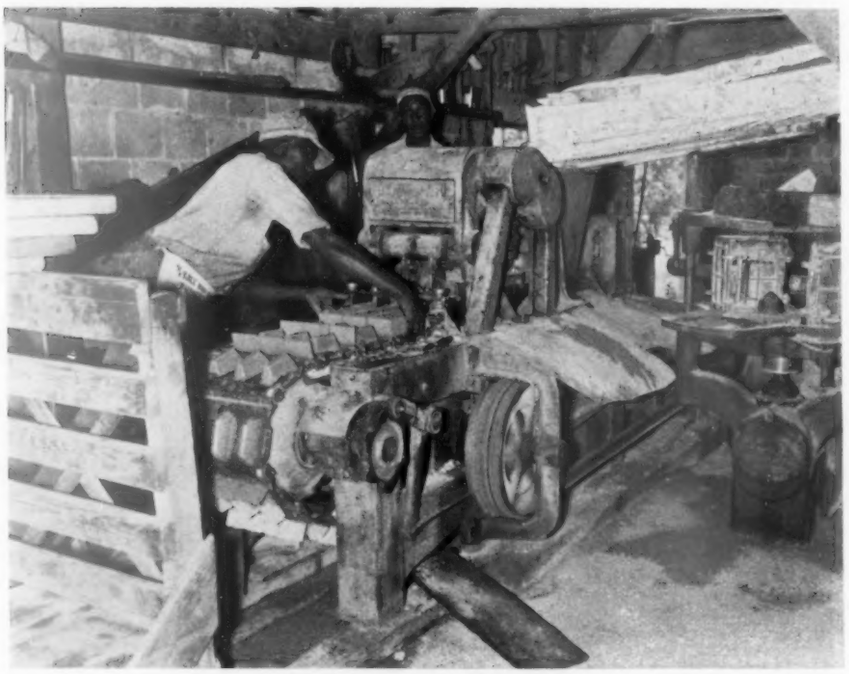
Alert Florida Operator Is Constantly Adding New Products to His Line

THE area in and around Miami, Florida, has been one of the proving grounds for concrete units and has contributed many new uses to the industry. One of the oldest but most progressive manufacturers in this area is W. M. Ketchin, of Fort Lauderdale, Florida, who operates the Ketchin Duntile Company and the Ketchin Brick & Tile Company in that city. While this concern is not one of the largest producers in this area, the line of products it manufactures is one of the most complete to be found anywhere.

Mr. Ketchin's background is as interesting as his present business. He got his start in Simsbury, Connecticut, as a contractor, and also was connected with the Ketchin Tobacco Corporation which grew, warehoused and sold shade-grown tobacco. Most of the construction required dimension stone and two brown-stone quarries were operated to supply it. In 1925 he gave up these businesses and moved to Fort Lauderdale, where he began to manufacture concrete blocks and heavy-duty concrete pipes. The permanent population of that thriving community increased from 6,000 in 1925 to about 16,000 in 1938. Building-permit totals in 1932 were $60,000 and in 1938 they were $12,700,000.



A view in the Ketchin yard showing some of the brick and tile storage.



The brick machine in operation. Tile machine at the right.

Among the company's original products were Dunbloks and Duntiles, but many other products have been added to the line. Septic tanks were added some years ago and, on an average, 60 tanks are now sold monthly, along with 12,000 4-inch drain tiles and a considerable footage of concrete pipe. Three years ago a Dunbrik machine was installed. Mat Glazing has been done for more than 12 years. Late in 1938 the manufacture of Stonex floor and bathroom tiles and vibrated concrete joists was begun. Now about 1,500 square feet of floor tiles and 360 lineal feet of joists are made daily. Over one million single and triple Dunbriks were made in 1938.

Mr. Ketchin has been very successful in promoting Dunn Ideal hollow-wall construction. Some houses were built several years ago with 8-inch walls using single bricks but now 12-inch walls and triple bricks are more popular as they cost no more and have many advantages. The 12-inch walls have larger air spaces and consequently better insulation. The deeper reveals about the windows and doors add to the appearance of a building. These hollow walls can be reinforced by columns or by belt courses without the use of forms. The 12-inch wall costs about 25 cents per square foot of finished wall in place, which is about the same as the cost of all-wood construction. Concrete tiles and joist floors are being installed at a total cost of 52 cents per square foot, little more than the cost of wood floors.

One of the largest structures supplied with this type of construction is the building of the Packard agency and garage in Fort Lauderdale. This building is 100 feet by 60 feet in size and has an 18-foot wall. Concrete roof joists were used in it.

The concrete pipes made are actually

Joist vibrating table with the forms filled with concrete.

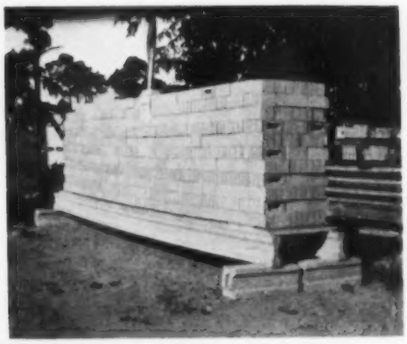
Joists in position for porch and main floor.

tiles as they are not reinforced. The saline action of ground water through any hair cracks occurring in these pipes would quickly deteriorate the metal and the pipes. These tiles are made in sizes from 12 to 54 inches in diameter. They are hand-tamped in Quinn heavy-duty forms. Concrete for these tiles and for the joists and flat tiles is mixed in a small Rex job mixer. A complete line of Y's, T's, and other fittings is also made.

The pipes are sold chiefly to the city for drainage purposes. Some of the network of small canals, which formerly drained this area, are now being filled in and the storm sewer lines are laid in them. Placing of the pipe is supervised by the company.

Inside the plant most of the mixing is done by a Dunn shovel mixer which supplies the Dunbrik machine and the two Duntile machines. There is ample storage space in this building for one day's production of all the products except pipes. There are three curing rooms with concrete-masonry walls and roofs. The air in these rooms is kept saturated by sprays, and curtains are used to close their open ends. After 24 hours these products are moved outdoors and are kept under a fine spray for three days.

There is also a Dunn mixer for Mat Glazing. Colorcrete guns are used for glazing colored buildings. Glazing of the completed walls instead of the separate building units is preferred because it prevents seepage at the joints. Color formulas of the Dunn company are



Two 3- by 8-inch joists 14 feet long under 10,000-pound load showed 1¼ inch deflection. There was no deflection at 5,000 pounds.

used in many shades and these are mixed in with the concrete.

Joists are made, in any desired size and in lengths up to 18 feet, on a vibrating table of the company's own design. These joists are reinforced in the usual manner with rods and stirrups, which is a safe practice as their exposure to salt air and water is much less and their resistance much greater than is the case with concrete pipes.

The floor tiles are made in highly-polished galvanized pans and are vibrated on small electric tables. These tiles are 24 inches by 24 inches in size and 2 inches thick and are reinforced with wire mesh. The bathroom tiles are made in the same manner in all

Erecting a 12-inch hollow wall. Reinforced-concrete columns were poured every 12 feet.

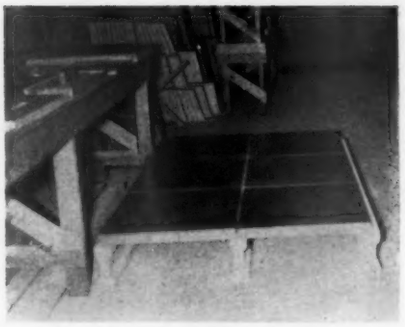
Demonstration walls of brick and tile.

sizes from 6 by 6 inches up to 12 by 12 inches.

The joists are left in the forms overnight and the floor tiles are removed from their pans after 48 hours. Both are cured outdoors under wet bags.

The company's property is 135 feet wide and 600 feet deep, giving ample space for outdoor storage. The usual stock carried includes 100,000 bricks, 10,000 to 15,000 block tiles in popular sizes, pipes, joists, "specials," etc. Sample walls, walkways, etc., have been built to demonstrate the use of these units.

Local lime-rock from below water-level and local sand are the chief aggregates used in the manufacture of joists, bricks, etc. For floor-tile surfacing a quartzite sand is purchased from the Florida Gravel Company in the western part of the state. Water-cement-ratio concrete is used and the strengths far exceed specification requirements.



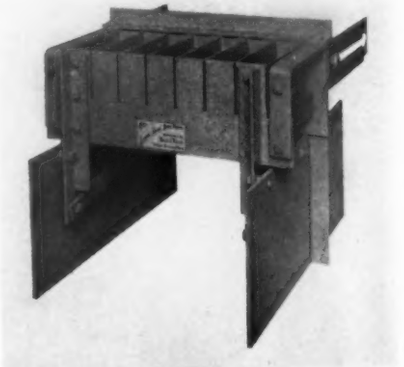
Some of the floor tiles which are compacted by vibration.

The Ketchin Duntile Company is a holding company, of which W. M. Ketchin is president, and a son, W. A. Ketchin, is secretary-treasurer. The Ketchin Brick & Tile Company is a partnership of father and son.

• Admixture

An admixture for concrete, called Mellitol, is said to possess numerous qualities which definitely improve the quality of concrete units.

The admixture, supplied in the form of a powder, is said to increase compressive and bending-tensile strengths 20 to 25 per cent., reduce shrinkage, waterproof to a high degree, and allow the use of extremely dry mixtures. One per cent. of Mellitol is added to the weight of the cement before mixing. Tests by the Pittsburgh Testing Laboratory and other inspection organizations are said to have proved the efficacy of the admixture. It is being marketed by the Mellitol Manufacturing Company, New York City.



The Little Dave Brickmaker is a low-cost, hand-operated concrete-brick machine, simple in operation and sturdy in construction being marketed by R. F. Reed of Three Rivers, Michigan. The mold box is arranged to make seven bricks on edge on economical plain wood or steel pallets. The machine is operated by a simple system of levers which open or close the mold box in one easy operation. The operation which opens the machine also trowels the sides of the brick as it draws the dividing blades through the backplate of the mold and out of the way.

HAVE YOU HEARD?

YOU CAN BUY REX MOTO-MIXERS ON THE TIME PAYMENT PLAN!

• Now is the time to buy the truck mixer you need—now, when you can buy Rex Moto-Mixers on the time payment plan that allows 12 full months for you to pay for them! And look what your money buys—mechanical superiority that keeps Rex Moto-Mixer users in the "low bidder bracket": the Rex cone end drum, only one of its kind; the Rex one-man-end controls; the Rex zipper-type chute suspension; the Rex high discharge (jackass hoist) for greater spouting distances; and the exclusive Rex 3-point drum suspension that stops end play before it has a chance to start!

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YOU PAY for them while you use them over a year's time. No large initial investment—chances are good that your Moto-Mixer earnings will help them pay for themselves!

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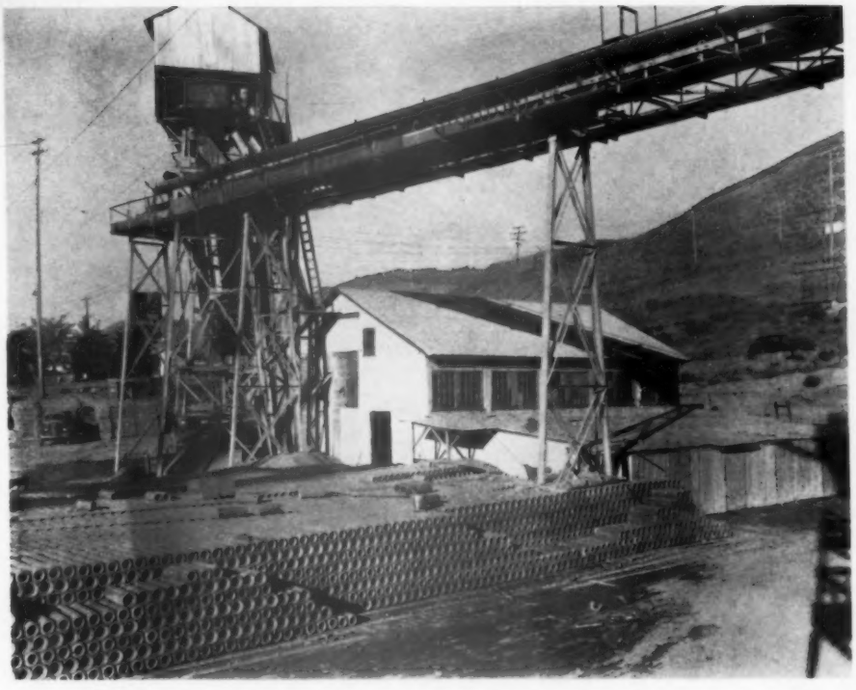
By W. E. TRAUFFER



Plant and part of the outdoor storage of the Columbia Concrete Company at Coulee Dam.

No-Slump, 1:5 Concrete Used to Make Porous Drain Tiles

AMONG the many and varied activities connected with the construction of Grand Coulee Dam is the manufacture of what is probably the most porous concrete drain tile ever made. These tiles are being installed in vertical rows at 10-foot centers 13 feet back from the up-stream face of the dam. They extend from bed-rock, which ranges from elevation 880 upward to the top of the dam at about 1,300 feet. This drainage system is similar to one installed at Boulder Dam and is a precautionary measure to collect any seepage which might come through the face of the dam, especially at pour joints, eliminating hydrostatic pressure which might eventually force a leak completely through the dam. The tiles drain into a gallery from which the water can flow or be pumped out.

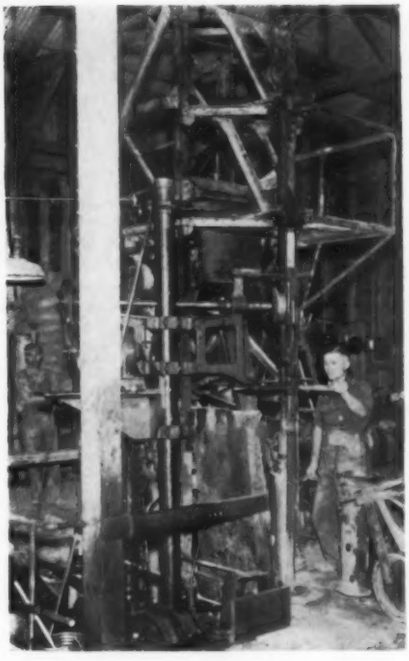
The tiles being used for this purpose are 5 inches in interior diameter and 2½ feet long with a shell 1½ inches thick. The specifications of the Bureau of Reclamation require a leakage of 30 gallons per minute in an 18-inch length. The tiles now being made have tested as high as 80 gallons per minute but average 50.

At Boulder Dam these tiles were made by hand and a crew of 9 to 10 men made an average of 50 tiles daily. For the lower section of Coulee Dam a total of 33,512 feet of pipe was made by hand under contract by a pipe manufacturer in Spokane, Washington. When the contract for the upper section of the dam was let to Consolidated Builders, Inc., the Columbia Concrete Pipe Company of Wenatchee and Yakima, Washington, obtained the contract for 131,000 lineal feet of tile to finish this project.

Before bidding on this contract the company worked out a method for making this tile with an ordinary tamper-type pipe and tile machine, one of the first times, it is believed, that this has been done successfully. A pipe machine was then moved from the company's Yakima plant and a plant was built at Coulee Dam under the conveyor system which carries aggregates from the sand-and-gravel plant to the main storage near the concrete-mixing plant. The tile plant went into operation on July 18, 1938, and has been making an average of 290 tiles in an 8-hour day with a crew of 5 men.

The tiles are made with a mix of 1:5 modified cement and gravel using a dry mixture with no slump. Only a very small amount of sand is used. A small amount of 1:2 cement-sand mortar is placed in the bottom of each mold before the concrete for the body of the pipe is poured and a little is placed on top while the tamper is still running. This method results in a tile with solid ends and a porous body. Special molds designed for this purpose are used. The aggregates and cement are supplied by the government.

At first early-strength cement was used but this was found to be too expensive. The modified cement alone required 1½ hour's setting time before the molds could be removed, requiring either an excessive number of expensive molds or a serious curtailment of capacity. By using mixing water with a temperature of 180 degrees F. and an admixture of 2 per cent. calcium chloride it is now possible to remove the molds in 1½ hour. Only 22 molds are used under this system and the first is stripped as the last one is being filled. The tiles are cured in spray rooms for two days before they are moved out of doors where they are sprayed for twelve more days. During cold weather 4,000-watt electric heaters with blowers are used in each of the fine kilns to facilitate curing.



Machine used to produce the porous tiles.

All this work is done under government inspection and frequent tests are made. A crushing strength of 1,500 pounds per lineal foot is required and the tiles have averaged over 2,000

The CONCRETE MANUFACTURER

Will not BREAK, CRACK or WARP

Blocks made on cored pallets are better blocks because they are more uniformly cured and cheaper to cure. Cored pallets permit use of machines which leave no core bar marks or weak places beneath core bars either on faces, ends of corner block, or webs.

The user of cored pallets is not limited as to the range of core sizes. He buys cored pallets with the maximum air space and produces blocks with smaller air space by using shouldered cores.

THE COMMERCIAL SHEARING AND STAMPING CO.
YOUNGSTOWN, OHIO

Close-up view of some of the extremely-porous units.

pounds. In testing porosity a section of tile is set upright and water is run into it through a hose connected to a Trident water meter. The rate of water feed is then adjusted until the water level in the pipe reaches and stays at the 18-inch level. The flow in 1 minute then is the measure of porosity.

The gravel and sand used are diverted from the aggregate conveyor previously mentioned into the plant bins. The aggregates are then discharged through spouts into pneumatic-tired buggies standing on a platform scale to insure accurate proportioning. A 1-bag horizontal blade-type mixer and a skip are used in connection with the pipe machine. Filled molds are carried to the kilns with special carts. After they have been stripped an electric drill with extension brushes is used to clean the molds before they are again used.

H. R. Kipp is plant superintendent.

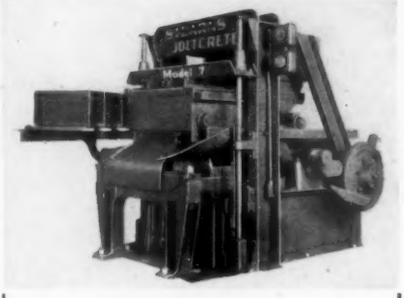
Superintendent H. R. Kipp testing the rate of flow through a section of tile.

VIBRATION
—combined with
Pressing Makes the Best Blocks

Here's the Machine That Does It

KENT MACHINE CO.
Cuyahoga Falls, Ohio

The Vibration Machine Supreme

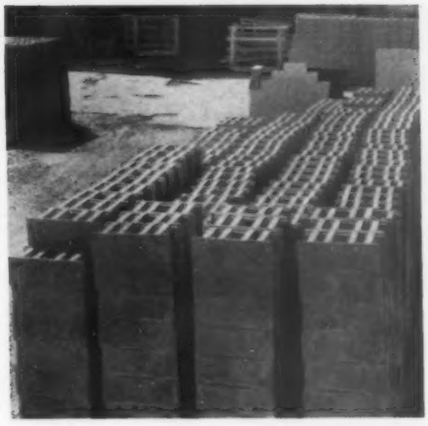


Vibration under pressure — 7,200 blows per minute—and ruggedly built to give long life, the Joltcrete machine is the choice of the wise concrete-products operator. Produces clean-cut, high strength units in any size, and gets the most out of a bag of cement. Built in three sizes with capacities of 7 to 9 standard units per minute.

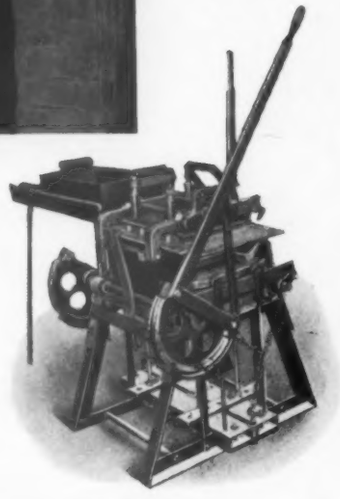
Hobbs block machines, Anchor tampers Anchor Jr. strippers, Stearns power strippers and Joltcrete, Stearns mixers, and Cast Iron and Press Steel pallets, Straublox oscillating attachments, etc. Repair parts for: Anchor, Ideal, Universal, Stearns, Blystone mixers and many others.

ANCHOR CONCRETE MACHINERY CO.
G. M. Friel, Manager Columbus, Ohio

HIGH STRENGTH AT LOW COST



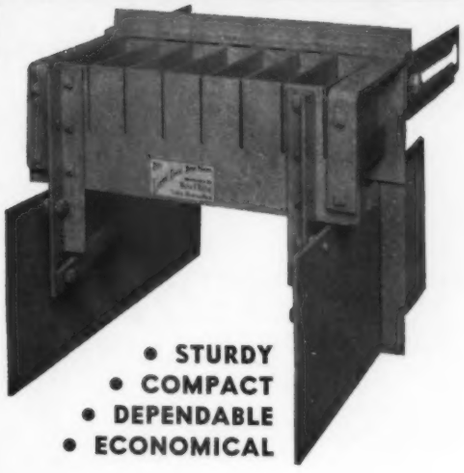
- Machines available for any size or type of unit.
- Powerful pressure achieved by long, hand-operated levers.
- Low first cost, long life, low upkeep.



Don't tie up your money in a high-priced concrete block machine . . . this patented DOUBLE PRESS Machine makes high-strength, high-quality units, equal to any produced anywhere, at new cost. Write for the facts—NOW!

MORTARLESS TILE MACHINE CO., Inc.
3328 San Fernando Rd.
Los Angeles, Cal.

LITTLE DAVE is a MONEY MAKER



- STURDY
- COMPACT
- DEPENDABLE
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This compact, hand-operated machine makes smoothly-troweled, sharp-edged concrete brick . . . 7 at a time, up to 4,000 per 8-hour day . . . at an average cost, including materials and labor, of $6 per thousand. The Little Dave Brickmaker has been proved in 10 years of service. Write for details . . . its low cost will amaze you!

Salesmen: Valuable territories open—write for our attractive proposition.

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Interested In Increasing Your Production?

Clyde Whirleys . . . the most efficient machines for rapid and profitable handling of sand, gravel and other pit or quarry materials.

Write for Bulletin K-12 and be convinced of the superiority of these modern and versatile machines. Capacities are from 70 tons at 35 ft. radius to 11 tons at 150 ft. radius. Suitable for either clamshell or drag line operation.

CLYDE IRON WORKS, Inc.
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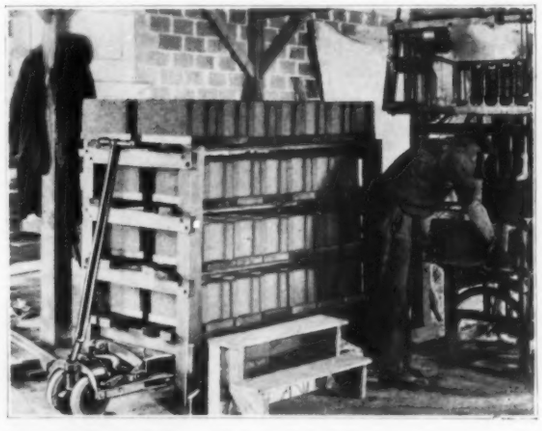

END BACK AND BLOCK BREAKAGE WITH BARRETT *Lift Trucks!*

TRY BEFORE YOU BUY! Use it 15 days FREE in your own plant—see for yourself what they save in work and costs.

One man, a Barrett and a rack readily move 48 of the 8"x8"x16" or 32 of the 8"x12"x16" blocks to the curing room with little effort and without breakage, jogging out of shape or spoilage. Super spring frame and rubber tires do the trick. Lets load down easy.
Barretts have proved lowest cost equipment for handling stones, blocks, pipes, tile, bricks, sewer rings and other cement products. Send today for bulletin and prices.

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QUINN PIPE FORMS

HAND or WET PROCESS

Make concrete pipe on the job with *Quinn Pipe Forms*. Quinn Pipe Forms can be handled by less experienced labor and produce uniform concrete pipe of highest quality. The recognized standard of all concrete pipe.

HEAVY DUTY CONCRETE PIPE FORMS

Built to give more years of service—sizes for any diameter pipe from 12 to 84 inches—tongue and groove or bell end pipe—any length. Backed by years of service in the hands of contractors, municipal departments and pipe manufacturers.

NEW MEDIUM DUTY CONCRETE PIPE FORMS

Meet the demand for low cost equipment that produces a uniform quality of pipe in smaller amounts. Complete in every way. Stands up on any job. Same sizes as "Heavy Duty," from 12 to 84 inches—any length.

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Get complete information on prices and Special Construction features of Quinn Pipe Forms. Give us size of job for estimate on your pipe form needs.
Also manufacturers of concrete pipe machines for making pipe by machine process.

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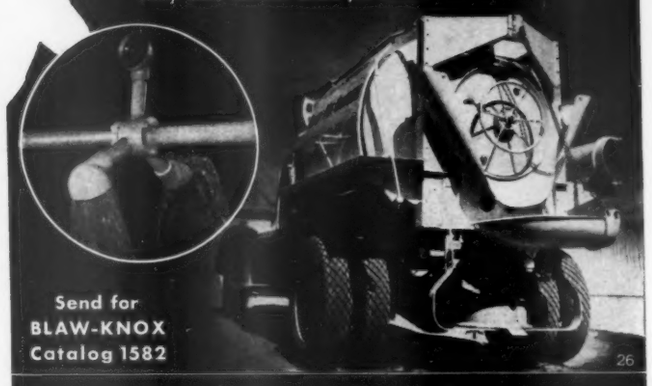
"MAN... That new WATER IMPELLER in BLAW-KNOX TRUKMIXERS puts water into the batch in one-third the time formerly required."

The new, fast water impeller that won't clog; an accurate and dependable water measuring system; superb mixing action—and assurance of dependable continuous operation make Blaw-Knox Trukmixers the popular choice, and the practical buy for you. Study these features before you decide.



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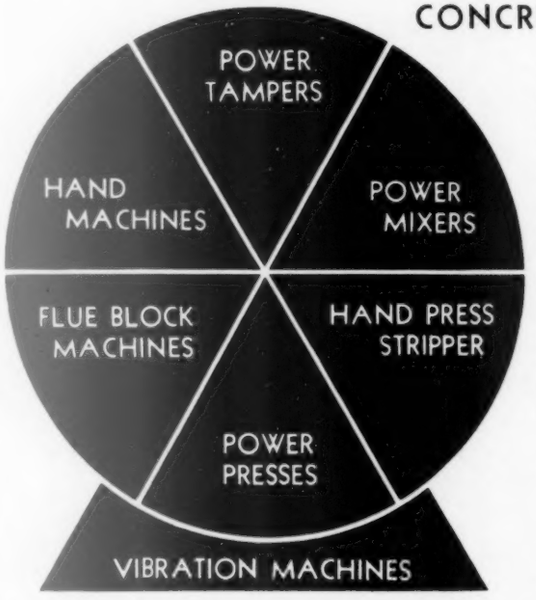
BLAW-KNOX BLAW-KNOX DIVISION OF BLAW-KNOX CO. Farmers Bank Bldg. Pittsburgh, Pa.

Agitators and **TRUKMIXERS**

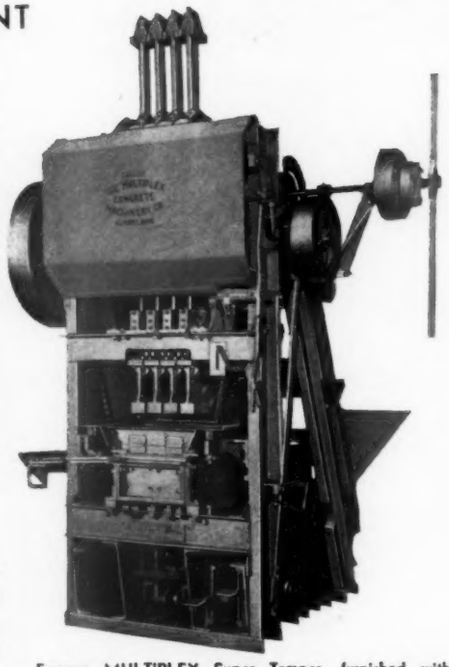
For a "Better *MULTIPLEX* Cut" in 1940

CONCRETE EQUIPMENT



"Help yourself" to a larger slice of profits in the concrete blocks business by specifying MULTIPLEX equipment, the choice of experienced and successful operators.

MULTIPLEX has supplied the industry with high-production concrete machines—real money-makers for low-cost operation—since 1906—and the latest designs for 1940.



Famous MULTIPLEX Super Tamper, furnished with 8-bar tampers. Adaptable for all kinds of aggregate. Position-timed feeding and stripping and 5 point clutches insure quick action. Molds Ashlar units in all sizes.

Write for full details

In addition to the above units, the MULTIPLEX line includes: Power Strippers, Super-Tampers, Tile Machines, Random-Ashlar Machines, Brick Machines, Cars, Racks, Moulds, Forms. MULTIPLEX will install complete concrete product plants designed and equipped throughout to suit individual requirements.

MULTIPLEX Super Tamper, the sensational new concrete block machine which insures better units at lower cost. Heavy duty type—gives you top *quality* production.

The *Multiplex* CONCRETE MACHINERY CO. ELMORE, OHIO

Miles
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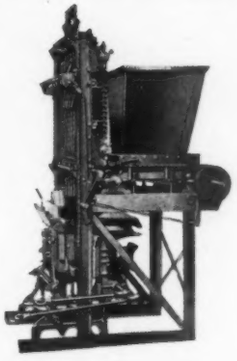
INVESTIGATE BEFORE YOU BUY

the PIONEER EQUIPMENT of the industry, not an experiment, but a proven success with which you are assured a larger production of high quality blocks at both a lower first cost and a lower operating cost, facts well worthy of your serious consideration.



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Dept. 20
JACKSON, MICHIGAN

Give it the
STOP WATCH TEST

DON'T . . .

take our word for it. Watch a Smith-Mobile in operation and give it the stop watch test. Prove to your own satisfaction that Smith-Mobile Truck Mixers are definitely faster in all three phases of the batch cycle . . .

FASTER charging because Smith-Mobile has a large roomy charging chute that makes it easy to spot mixer under bin gates. *No troublesome, leaky hatch to open or close.* Driver can stay in cab. Water is introduced through feed opening. No clogged water bells buried in concrete.

FASTER and better mixing. Shrinking and mixing start the instant the batch enters the drum, because *drum rotates during the charging operation.* Scientific blade design produces positive "end-to-end" movement of aggregates. Sealing door can be opened wide during mixing cycle. You can look in drum and actually SEE what's going on.

FASTER delivery of the concrete into the forms. High discharge permits steeper and longer distributing spout. Covers greater area even with dry concrete. No hoist or ramp required.

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THE T. L. SMITH COMPANY
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4 yard Smith-Mobile truck mixer — 6 yard agitator.

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THE *Modern* TRUCK MIXER and AGITATOR

SAUERMAN
Long Range
MACHINES

This picture shows how Sauerman Cableway digs dry and wet gravel and moves material to top of screening plant at total cost of a few cents per cubic yard.

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(Upper View) A simple Sauerman Power Drag Scraper installation stores and reclaims seasonal surplus of crushed fines at large stone crushing plant.

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PROBLEMS of moving gravel, sand, crushed rock, distances of 100 to 1000 ft. or more are solved cheaply with Sauerman Scraper or Cableway machines.

There is a double saving when you use a Sauerman machine. You keep down your equipment investment and your daily operating expense is lower than with any other equipment able to dig and haul an equal yardage. One man handles the entire operation. Capacities range from 10 to 1000 cu. yd. per hour.

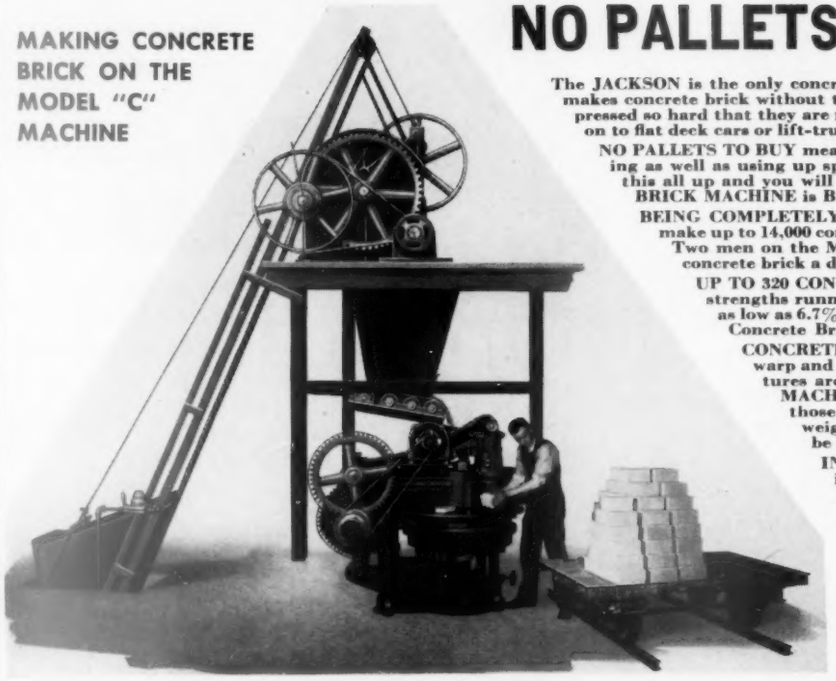
Sauerman engineers will be glad to study your excavating and stockpiling problems. Their advice may help you to increase your profits. Investigation costs you nothing.

SAUERMAN BROS., INC.
434 S. Clinton St., Chicago

BIG IN MONEY SAVING PERFORMANCE!

NO PALLETS–LOW UPKEEP

MAKING CONCRETE BRICK ON THE MODEL "C" MACHINE



The JACKSON is the only concrete brick machine on the market today that makes concrete brick without the use of any pallets whatever. The brick are pressed so hard that they are removed from the machine by hand and piled on to flat deck cars or lift-truck platforms and allowed to cure.

NO PALLETS TO BUY means no time wasted in handling and maintaining as well as using up space to store them when not being used. Add this all up and you will be convinced why the JACKSON CONCRETE BRICK MACHINE is BIG IN MONEY SAVING PERFORMANCE.

BEING COMPLETELY AUTOMATIC, one man at the machine can make up to 14,000 concrete brick a day, on the Model "C" machine. Two men on the Model "A" machine can turn out up to 28,000 concrete brick a day.

UP TO 320 CONCRETE BRICK PER SACK OF CEMENT with strengths running as high as 3700 lbs. p.s.i. and absorptions as low as 6.7% is being had by some producers using Jackson Concrete Brick Machinery.

CONCRETE BRICK that are uniform in size, free from warp and with clean cut, sharp edges and beautiful textures are made on the JACKSON CONCRETE BRICK MACHINERY, which makes them far superior to those made on any other equipment. Either lightweight aggregates, cinders or sand concrete may be used.

INVESTIGATE TODAY, do not delay getting into a profitable concrete brick business with one of these machines. Our engineering department will gladly assist you in your plant layout and equipment selection.

Since 1881

JACKSON & CHURCH CO.
SAGINAW, MICHIGAN

START A NEW BUSINESS

This shows one of our Multiple Molds for casting 8x8x16" concrete blocks. We manufacture a complete line of Multiple Molds for blocks (both Rockface and plain), for brick, veneer blocks, etc. We are also owner and originator of the ZAGELMEYER SYSTEM of granite veneer for blocks.

Make
ZAGELMEYER
Waterproof Concrete Blocks

A Start May Be Made With as Little as $500.00

The Zagelmeyer System produces a block that no other system can equal. Many good territories open. Write today for further information.

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These Jeffrey - Traylor totally enclosed 4' x 7' electric vibrating conveyan- screens are equipped with 60-mesh stainless piano wire cloth, which is ideally suited for preparing clean products.

Jeffrey - Traylor engineers recognize the complexities of screening and exercise great care in the selection of screens for your sizing, scalping, by-passing, rescreening and dedusting processes. For screening efficiency, call on Jeffrey. We will help you choose the correct type of equipment.

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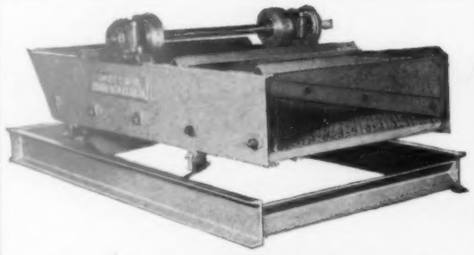

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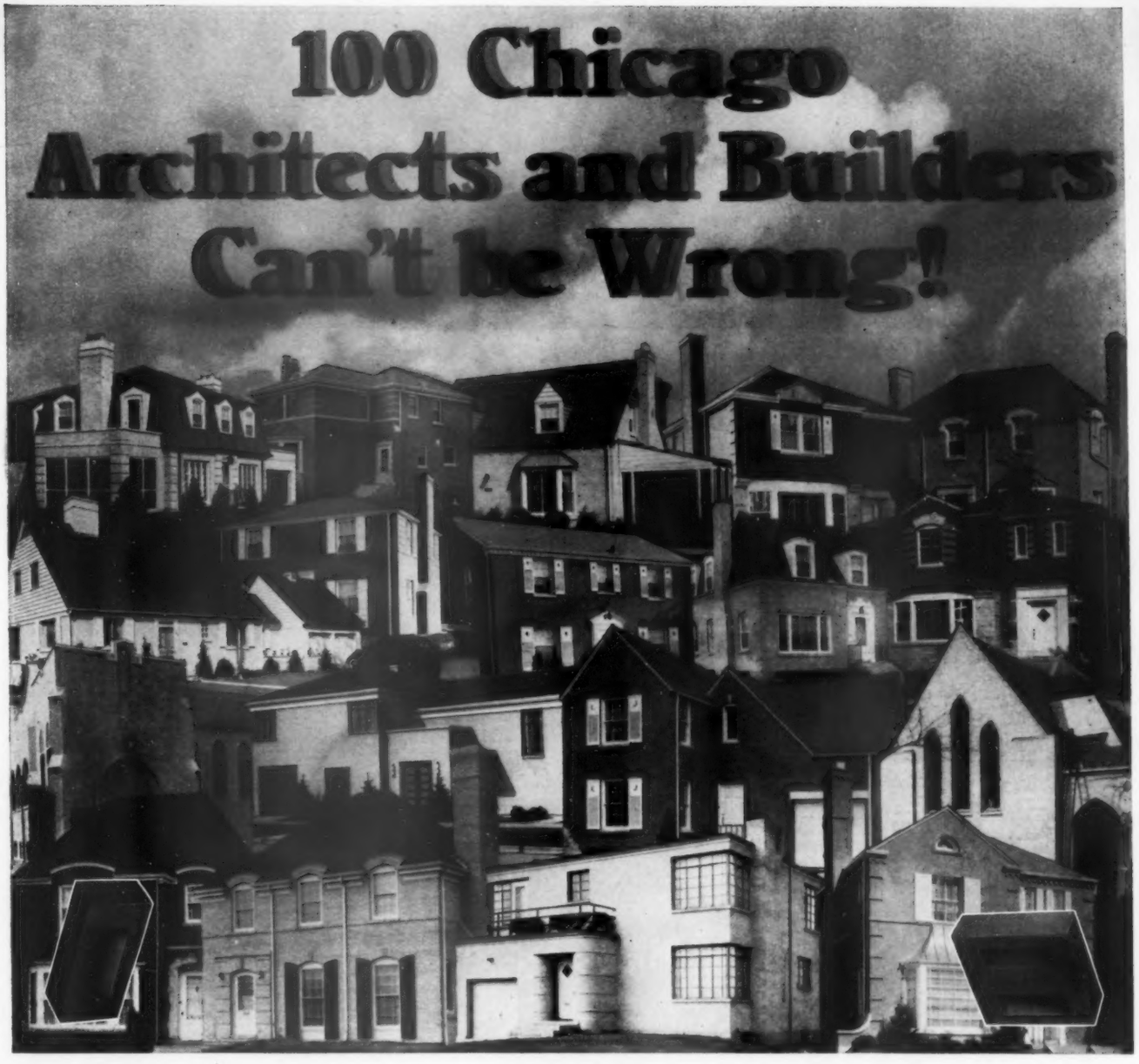
"I'm probably the youngest shovel operator that ever swung a dipper stick—but already PIT AND QUARRY is my favorite magazine."



Neither are the 32 Producers that are Manufacturing Dunbrik

BECAUSE — IN DUNBRIK these producers have a manufacturing business that is basically sound and profitable — their territories are protected — their manufacturing costs are the lowest in the industry.

BECAUSE — THEY ARE PRODUCING a trade-marked product, nationally advertised to the building industry — a product that has met every test. Its acceptance and salability is quickly established wherever manufactured. These facts are proven by its use in all types of construction.

BECAUSE — DUNBRIK Automatic Line Production plants enable them to utilize their surplus aggregate and convert it into a building material. One with all the advantages of Lighter Weight — Greater Strength — Lower Absorption — Water Repellant Faces, and Absolute Accuracy in all dimensions. At the same time, there are provided two exclusive time-proven methods, making a product of unequalled beauty, and with the most complete range of colors, shades and textures in the building field.

BECAUSE — THEIR DUNBRIK PLANTS are flexible and also produce multiple sized units (DUNSTONE). This unit is revolutionizing the Masonry Material Market, thus enabling builders to produce many structural improvements and utilize short-cut methods that bring the cost of permanent, fire-safe, termite-proof construction down to the cost of frame.

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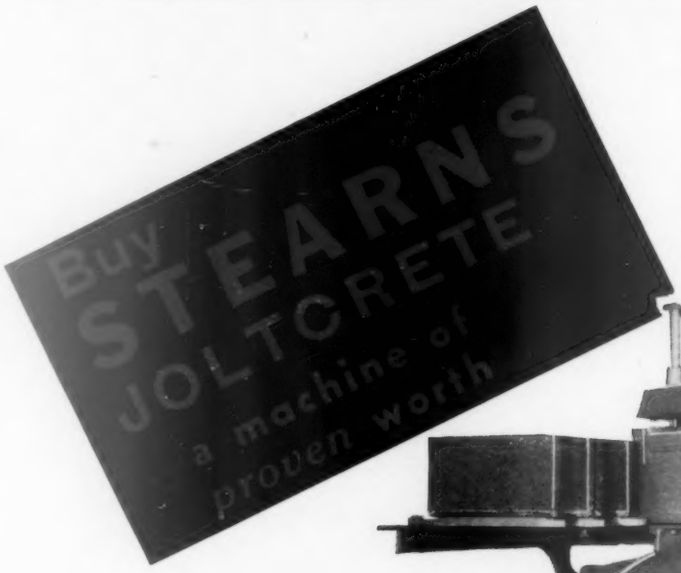
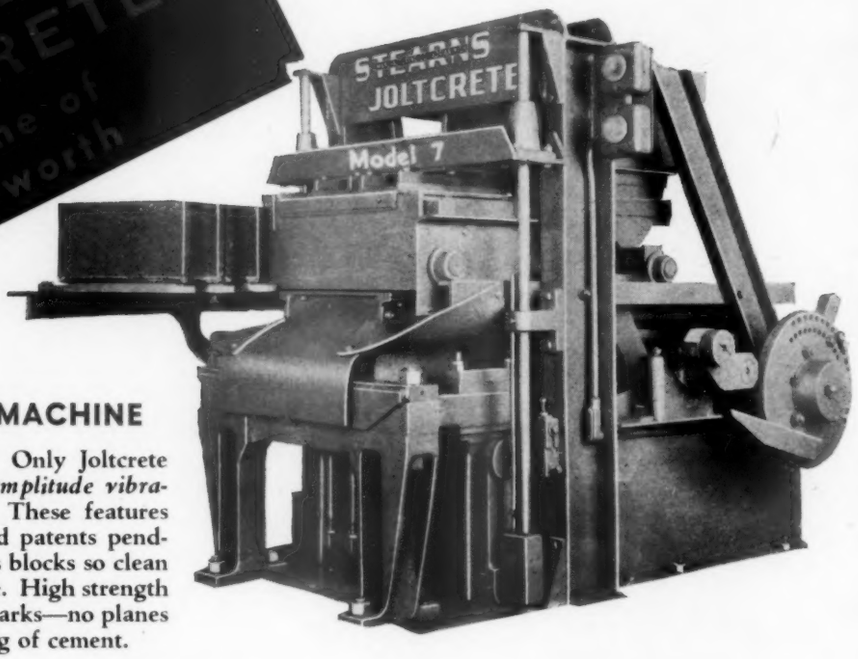
W. E. DUNN MFG. CO., 420 W. 24th St., HOLLAND, MICHIGAN



Stearns Joltcrete operates automatically. Made in three sizes with capacities up to 8″ blocks per minute. Uses your present cored pallets or inexpensive new ones. (Ask for pamphlet "The Advantages of Cored Pallets.")

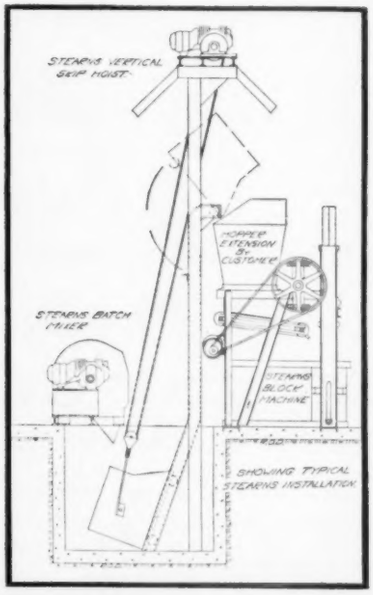


STEARNS JOLTCRETE MACHINE

Only Stearns makes Joltcrete. Only Joltcrete subjects the concrete to *limited amplitude vibration—vibration under pressure.* These features are covered by broad patents and patents pending. And no other process makes blocks so clean cut, true-to-size, uniform in texture. High strength —low absorption. No core bar marks—no planes of weakness. More blocks per bag of cement.

STEARNS CLIPPER STRIPPER

Ideal for small plants and, in batteries, achieves low production costs in large plants. Eight bar tamping produces dense, uniform blocks, increases block yield per bag of cement. Available in four models, with down-face, rock face and brick attachments available.



STEARNS SKIP LOADERS

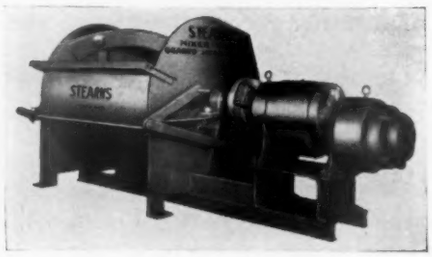
for charging dry materials into elevated mixers or for elevating mixed concrete to feeding hoppers. Independent and mixer drive types. May be used with any make of mixer. Proper track and cable lengths permit wide range of application.

STEARNS MIXER

The mixer with interchangeable, renewable, bar type liners of rough, abrasion resisting steel. "Sterloy" ribbon blades. Heavy steel shell electrically welded to steel ends. Quick opening, tight locking door. Low charging height. Large ball bearings perfectly shielded.

Pulley, V-Belt or Gear-Head Motor Drive. Skid or truck mounting.

Five sizes—3, 12, 18, 28 and 42-ft. *Prompt shipment from stock.*



Complete Concrete Products Plant Equipment

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MANUFACTURING CO. - ADRIAN, MICH.
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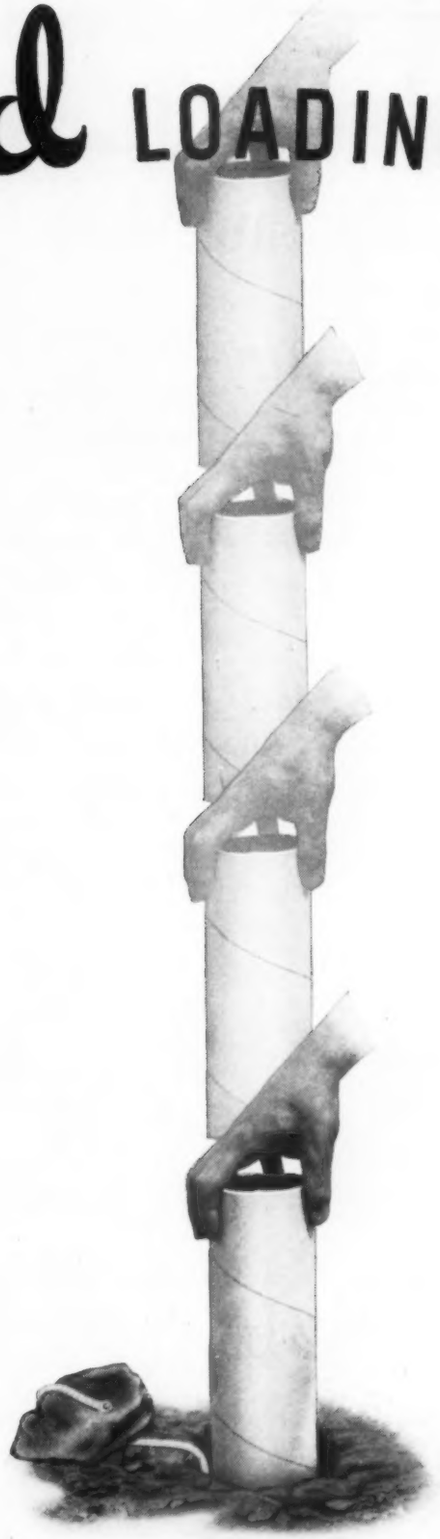
Write for folders on the machines you are interested in

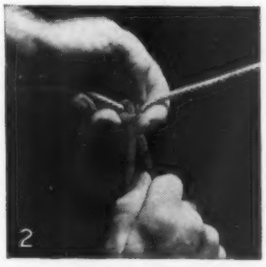
Simplified LOADING



LOADING bore holes is simpler, less hazardous, when PRIMACORD-BICKFORD Detonating Fuse is used. No detonating caps are needed in the holes. Primacord—insensitive itself to friction, fire and ordinary shocks—acts as the detonating agent. Running the full depth of the hole, in close contact with the entire load, Primacord gives each cartridge the extra power of a primer cartridge. Loading, stemming and tamping may be done quickly and efficiently.

When the load is ready, and the Primacord in each hole is properly connected to the main line, a single Fuse Cap or Electric Blasting Cap, attached to one end of the Primacord, sets off the entire blast in planned rotation. Primacord-Bickford makes large well-drill blasts practicable and profitable—and is widely used for smaller blasting.

1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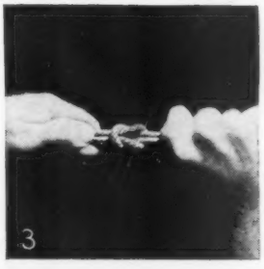
3

4

1. Tie through cartridge.
2. Half hitch branch to main line.
3. Connect main line lengths with square knot.
4. Fuse and cap on end of main line.

PRIMACORD-BICKFORD
Detonating FUSE

THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONN.

PB19 *Makers of Cordeau-Bickford Detonating Fuse—and Safety Fuse since 1836*

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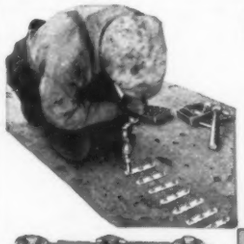
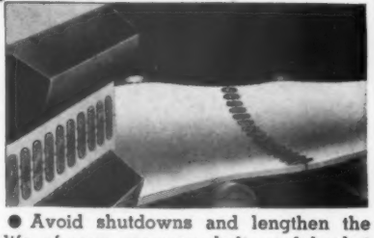
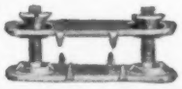


Keep your conveyor belts going with FLEXCO HD BELT FASTENERS



● **FLEXCO H D RIP PLATES** are used in repairing rips and patching conveyor belts. The wide space between outer bolts gives the fastener a long grip on the edges of the rip, while the center bolt prevents the fasteners from bulging.



● **FLEXCO H D BELT FASTENERS** make a strong, tight butt joint with long life. Recessed plates embed in belt, compress belt ends and prevent ply separation. Five sizes in steel and alloys.

● Avoid shutdowns and lengthen the life of your conveyor belts and bucket elevator belts by using Flexco HD belt fasteners and rip plates. Thousands of companies have stepped up the performance of conveyor lines and cut costs by using Flexco methods.

Bulletin F-100 shows exactly how to make tight butt joints in conveyor belts with Flexco HD Belt Fasteners. Also illustrates step by step the latest practice in repairing rips and putting in patches.

Write for your copy

FLEXIBLE STEEL LACING COMPANY
4623 Lexington St., Chicago

FLEXCO HD BELT FASTENERS
Sold by supply houses everywhere

HERE'S WHY IT PAYS TO TRADE THAT *OLD* SHOVEL!

Even with the best old-fashioned excavator, your costs can't compare with the economies made possible through the use of a modern, speedy and efficient P&H machine — fastest of its type on the market. Here's all-around economy that's just as important whether you use your shovel 50 or 350 days a year! With alloy rolled steel, welded construction, tractor-type crawlers and split-second control, P&H machines meet today's needs.

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Behind this simple statement is an oft-repeated story of economy, outstanding performance and experience in fitting Naylor light-weight pipe to the most exacting specifications.

Naylor's exclusive Lockseam Spiralweld structure makes it leak-tight, flexible, stronger and safer—ideal for high or low pressure lines.

Sizes from 4" to 30" in diameter meet every requirement. All type fittings and connections. Complete fabrication service. Write for Catalog No. 37.

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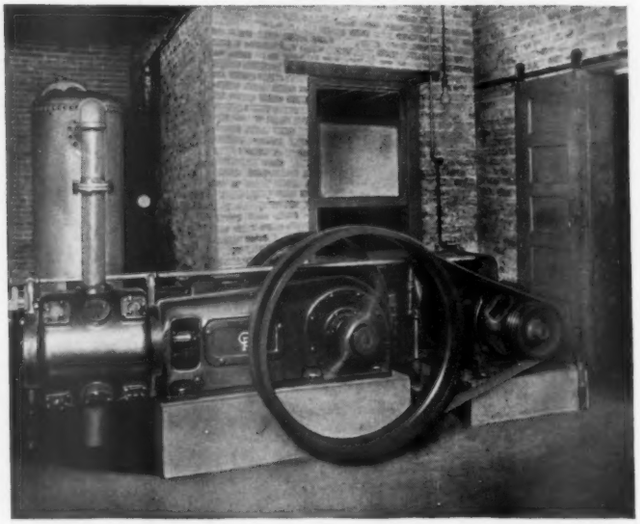
for DEPENDABLE LOW-COST AIR



Built for heavy duty, continuous operation, CP Class T, single-stage, double-acting compressor is ideal for quarry service. Its low power consumption, Simplate Valves, large smooth air passages, water-jacketed cylinder head and other CP features assure dependable, economical operation and low maintenance cost. » » » CP Class T Compressors are available in belt, direct-connected and steam drive, in capacities up to 600 c.f.m. piston displacement, 100 pounds pressure. Write for bulletin 728 or for literature describing other types of CP Compressors including two-stage air cooled.

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For spotting your cars- JONES CAR PULLERS

YOU will be surprised how much time can be saved in the spotting and switching of cars by using a Jones car puller. These sturdy, compact units will speed up car handling to the point where they soon pay for themselves in the saving of time and labor.

These car pullers are built by Jones as complete units with motor included if desired, or with base to take standard motor, as supplied by the purchaser. The cable drum is driven by a Jones triple reduction Herringbone speed reducer and the control station may be located at a point to give the operator a clear view of the tracks and spotting positions.

Even in plants where comparatively few cars are handled it has been found that a Jones car puller more than pays its way. Prices and complete information will enable you to judge whether such an outfit might pay out in your plant. Write for complete information.

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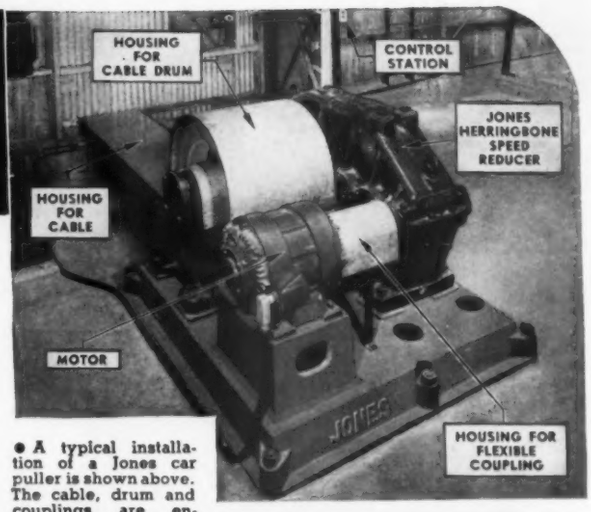
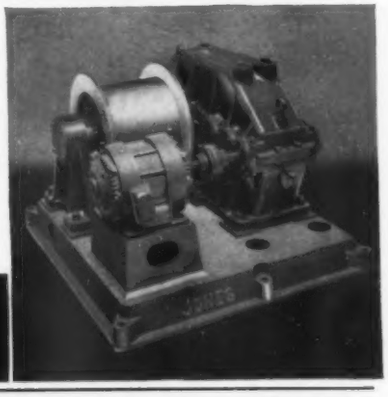


● A typical installation of a Jones car puller is shown above. The cable, drum and couplings are enclosed by sheet metal housings as an extra precaution in this installation to eliminate all hazard from moving parts.



● A complete Jones car puller unit. These outfits are for use with wire rope and are manufactured in a wide range of capacities to suit the number of cars to be handled in each plant.

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A *The* "ULTIMATE LOW COST WIRE ROPE"

New Gardner-Denver S73 SINKING DRILL

Here's the new speed and power necessary to drill faster in harder ground—to drill deeper holes—without the handicap of more weight!

It's the new Gardner-Denver S73 Sinker, weighing only 67 pounds. It uses no more air than the average 55-lb. drill . . . has excellent holding characteristics enabling the drill runner to maintain a high rate of drilling speed throughout the shift.

The new Gardner-Denver S73 Sinker is ideal for general drilling where increased footage in hard ground is desired. Get complete facts on this time-saving, cost-saving, easier-handling drill—write for bulletin. Gardner-Denver Company, Quincy, Illinois.

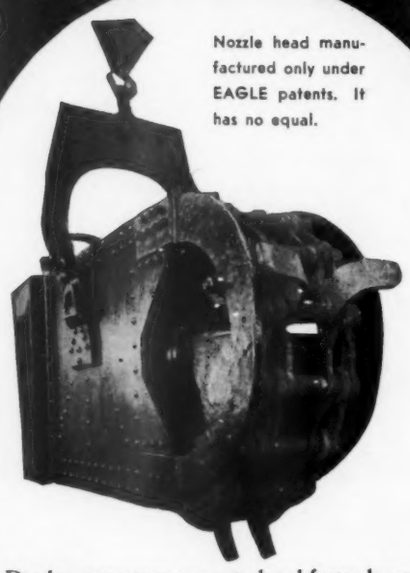
SPECIFICATIONS

Type of Drill	Wet or Dry Sinker
Length of Drill overall	Collared, 25"; Lugged, 24½"
Hammer Diameter	2¾"
Size of Steel recommended	⅞" to 1¼" Hex., Rd., or Q. O.
Size of Air Hose recommended	¾"
Size of Water Hose recommended	½"
Weight with Lugged Chuck (Wet)	74 lb.
Weight with Collared Chuck (Dry)	67 lb.
Weight boxed for shipment	100 lb.

GARDNER-DENVER
SINCE 1859

EAGLE
"SWINTEK" SCREEN
NOZZLE LADDER

The HEAD of its Class in Dredging Operations



Nozzle head manufactured only under EAGLE patents. It has no equal.

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This master unit has a screening and digging chain with cutters, insuring an even, constant feed of solids. Oversize removed from pumping zone. Works deposits inaccessible to plain suction. Eliminates slug pumping.

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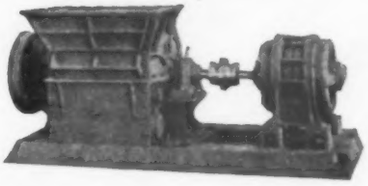

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These machines give high production of uniform quality material—10 to 100 tons per hour—and are the chief reliance of operators who demand sustained output under all conditions.

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Simple and easy to apply, too. All you need are a hammer and a block of soft wood.

Bristol's are available in sizes and styles for belts of any material and thickness. Free samples and Bulletin 72-5W yours for the asking. The Bristol Company, *Mill Supply Division*, Waterbury, Conn. Branches in Principal Cities.

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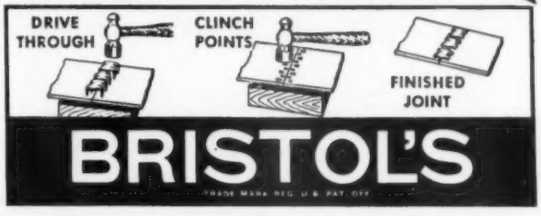

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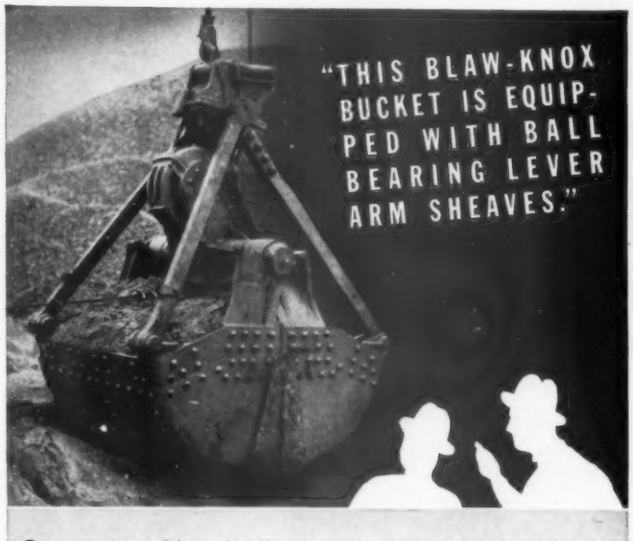

As a matter of fact this feature is standard equipment and does not cost more. It is especially desirable where the bucket handles loose granular materials because it keeps lubrication in and dirt out. This and many other desirable features of Blaw-Knox Buckets is fully described and illustrated in Bulletin No. 1606. Write for it today.

17

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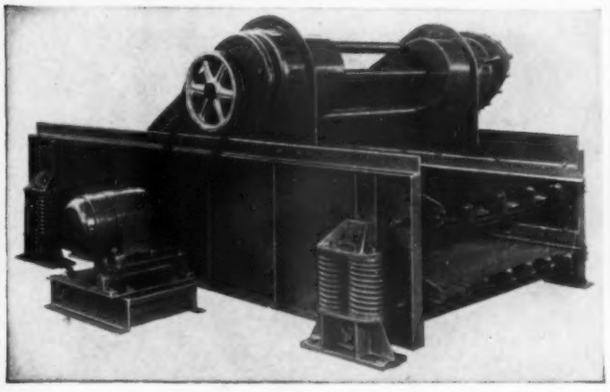

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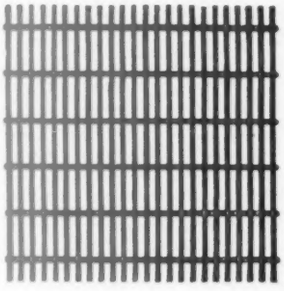

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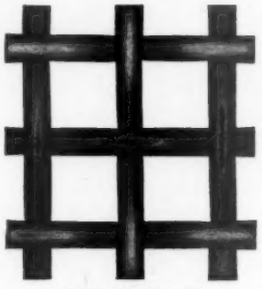

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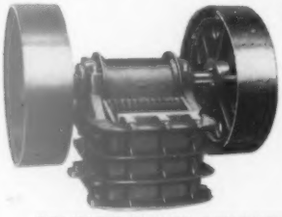

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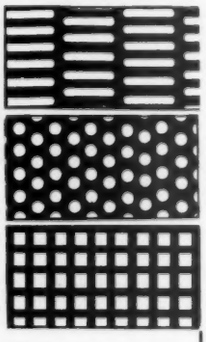

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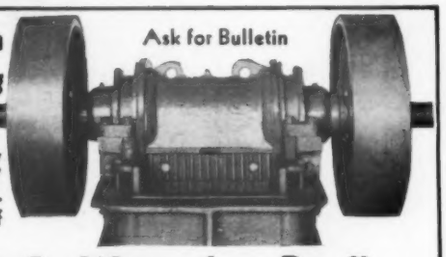

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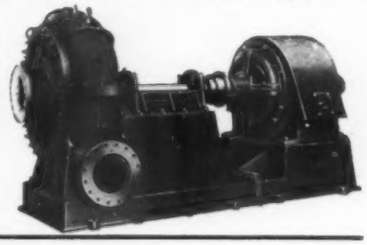

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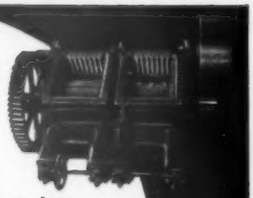

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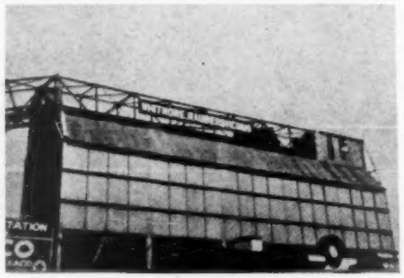
THE AUSTIN-WESTERN ROAD MACHINERY CO.
AURORA, ILLINOIS

OPPORTUNITY TO ACQUIRE very fine set of late model storage bins suitable for any type of aggregate materials. Unit is still erected at its original location in the yards of Whitemore, Rauber, and Vicinus, at Rochester, New York, where inspection can be made.



BUTLER-TYPE SPECIAL U2—1500 ton—5 compartment—each compartment 16'x16' —bottom discharge—roller gate shutoffs—truck room under bin for loading. All in excellent condition—Unit PRACTICALLY NEW—Will pass most rigid inspection.

In order to move these bins we are open to a reasonable offer for the immediate disposition of this outfit.

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USED EQUIPMENT

10x20 DIAMOND Roller Bearing Jaw Crusher.
10x36 DIAMOND Roller Bearing Jaw Crusher.
15x36 DIAMOND Roller Bearing Jaw Crusher.
2'0"x4'0" single deck DIAMOND vibrating screen.
6 to 8 HP model MRP3 LeRoi Engine.
Model No. U-40 Allis-Chalmers Engine.
4" Sterling Sand pump No. 3558.
60"x20'x0" Revolving screen — Structural frame on wheels.

NEW EQUIPMENT

1—DIAMOND 9x16 Bronze Bearing Jaw Crusher mounted on truck with 15-20 HP engine.
3'0"x8'0" Triple deck Diamond Vibrating Screen.
21-Cu. yard jack leg bin.
Special Price for quick sale.

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SHOVEL—Steam, Marion 100 on Caterpillars; 3½ cu. yd. Dipper excellent condition.

LOCOMOTIVE — Steam, American 40 ton, four wheel, saddle tank, overhauled.

CRANE—Steam, Ohio 20 ton capacity, double drum, bucket operating, 50' boom, rebuilt.

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LORAIN 75-A 1¼ yd. Shovel No. 3929.
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Whitcomb 4 ton Gas Loco., 24" Ga. Like New. $395.00.
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FIRST CLASS USED EQUIPMENT

1—CLYDE double Drum Drag Scraper Electric Hoist, with 100-HP Gen. Elec. Slipring motor, 220 or 440-V, 3-ph, 60-cy. Have third drum attachment for movable tail block. Band Frictions.
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Shovel Attachment for P & H 600.
Shovel Attachment for Northwest 1-yd.

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2—150 KW. 3/60/600 v. Winton-Elec. Mch.
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Hopper opening 12" x 46".
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Capacity tons per hour dry stone.
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Excellent condition. Used less than one month. Price $3500 Cash.

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One length of 12" BUCKET ELEVATOR BELT, with 10" buckets attached. Belt is 1/16" x 1/16" rubber covered. 71 ft.

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Jaw, Roll and Cone Crushers, all sizes.
6A, 10B, 32B & 40B Telsmith, 19 & 49 Kennedy.
No. 3, 4, 6 TZ Traylor Gyratory Crushers.
Swintex Cutters 25', 8"-50', 10"-45', 15" pipe.
6, 8, 10 & 12" Sand & Gravel Pumps, other centrifugals.
Conveyor Equipment 14"-36", belt and Portable.
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Gasoline Locos—all weights and gauges. Dump Cars.
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90 HP Fairbanks, 110 HP Anderson Diesels.
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Portable and stationary, belt with elec. or gas power, sizes from 20 cu. ft. to 1,000 cu. ft.

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10—1—118 ton Blaw Knox; 2—85 ton Heltzel; 1—60 yard Butler V-60; 1—72 Blaw Knox; 1—46 yd. Johnson offset; 1—60 ton Butler V-40; 2—35 ton Blaw Knox; 1—26 ton Heltzel with Kron-dial scale. All above with or without volume or weigh batchers.
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4—Steel frame belt conveyors: 3—18" Barber-Greene 60', 45' & 24'; 1—National 18"x30'.
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6—Jaw Crushers: 1—12 x 26" Champion; 1—12x20" Acme; 2—10"x20" Climax No. 2½; 1—9x16" Telsmith No. 9A; 1—9x15 Champion.
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1—12" Morris Heavy Duty D. C. to 100 H.P. dbl. cyl. steam engine.
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1—Mod. 75 Wiley Whirley No. 2973, 20 tons cap., 75' boom. 3 D Clyde 80 HP elec. hoist and 30 HP elec. swinger, all complete. Perfect condition.

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REDUC. TYPE: Kennedy Nos. 25, 37 & 49. Telsmith 3-F & 40. Traylor 36" TZ, 8", 10", 12". Super. McCully 6" & 10". Newhouse 5, 7 & 10". Symons Cone & Disc. Ty. 2' to 4'.

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CRUSHING PLANTS: No. 65 Diamond. No. 22 Pioneer 8x24. 1030 Good Roads, 9x40 Austin-Western, 9x36 C.R.

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Barges, Bins, Buckets, Boilers, Cableways, Cars, Compressors, Conveyors, Cranes, Dryers, Derricks, Draglines, Drag Scrapers, Dredges, Drills, Engines, Elevators, Excavators, Generators, Hoists, Kilns, Locomotives, Loaders, Motors, Pipe, Pumps, Rail, Scales, Screens, Slacklines, Shovels, Tanks, Trucks, Tractors, Etc., in many sizes, types and makes at low prices.

(I have equipment at many points in the United States and Canada. What you need may be near your plant.)

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Concrete batching plant, 5 compts., 1000 yds. aggregates, 750 yds. cement, automatic weigh batcher control.
200 ton steel bin, 3 compts., weigh batcher.
225 bbl. Erie bulk cement plant, complete.
155 bbl. Fuller cement bin, electric batcher.
Blaw-Knox 270 bbls. bulk cement plant, complete.
72 ton Blaw-Knox steel bin, portable, 2 compts.
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42 cu. yds. Beaumont steel bin, 2 compts.
Fuller Kinyon bulk cement unloader, portable.
Fuller C40 rotary air compressor, electric.
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Jeffrey type A 30"x24" pulverizer.
Apron feeders, 18"x6', 24"x6', 48"x14', 5'x15'.
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50-B Bucyrus-Erie steam shovel.
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Hasa clamshell bucket, 1½ yd. rehandling.
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8"x8" cent. Lawrence pump, portable, 35 HP, gas.
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Steam hoist, 10"x12", 3 drums, Lidgerwood.
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Machinery, Equipment, Auto Trucks
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The Mann Co., Inc., Quarry

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EAST NORRISTOWN, PA.

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QUARRY—Approximately 7½ acres, with R. R. siding from Penna. and P. & R. R.R.

STONE—Approximately 15,000 tons crushed stone.

MACHINERY & EQUIPMENT—Crushed plant, 2 Link Belt gasoline driven shovels with crawlers, gasoline driven stone loader, 32 steel dump cars, motors, pumps, 2 International steel body dump trucks, small tools, etc., office furniture, 200 tons of scrap iron.

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5½ ft. Symons Cone Crusher and Motor.
10x36 Gruendler Steel Frame Jaw Crusher.
6" Superior McCully Reduction Gyratory.
25 ton Plymouth Gasoline Locomotive. New 1932.
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All Sizes—Crushers—Shovels—Cranes—Compressors.

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Scalper Screen—72" x 12'—Galland Henning.
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10"—CI pipe—70 lb. rail—24" belt.
Head and tail pulley assemblies—rollers and idlers.

150 HP Motor	GE	220 V. 3 ph. 600 RPM
50 HP Motor	WEST	220 V. 3 ph.1120 RPM
50 HP Motor	GE	220 V. 3 ph. 900 RPM
50 HP Motor	GE	220 V. 3 ph. 900 RPM
30 HP Motor	GE	220 V. 3 ph.1800 RPM
30 HP Motor	GE	220 V. 3 ph. 720 RPM
25 HP Motor	GE	220 V. 3 ph. 720 RPM
15 HP Motor	GE	220 V. 3 ph.1200 RPM
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RELAYING RAILS—25,000 tons—All Sections—All Sizes, practically as good as New.
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Two front end Shovel Attachments for Model 52-B Bucyrus-Erie. Excellent condition. Reasonably priced.

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One Sauerman Slackline Cableway complete with 80 ft. steel mast, one yard bucket, 80 H.P., two speed hoist, electric. All Sauerman equipment throughout. None Better, extra good bargain.

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NEW WIRE ROPE FOR SALE

⅝", ⅞", ⅞", 1", 1⅛", 1½", 1¾", 2", 2¼"

This cable is BRAND NEW IN EVERY RESPECT. SUITABLE FOR HOISTING, GUY LINES, SHOVELS, etc.
VERY ATTRACTIVE PRICES.

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Waukesha Model HLU 4 cylinder 87 H.P. 6 x 6½ gasoline engine, skid mounted with sheet metal hood, air, fuel and oil filter, clutch, gas tank and belt pulley. Practically new. Excellent condition.

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Compressor, Sullivan angle compound 13-8x8, capacity 406 c.f.m., mounted on structural steel base and skids with A.C. Wagner 220 volt, 3 phase 60 cycle motor. Excellent condition.
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Sullivan 315 ft. compressor; exc. condition.
Browning truck crane on Mack truck.
Moore Speed crane 40 ft. boom, fairlead.
¾ Yd. Kiesler rehandling bucket, rebuilt.
Trackson shovels, rebuilt, $400 to $2000.
45 H.P. Continental and Wisconsin engines.

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Branch: 2272 S. 7th St., Springfield, Ill.

FOR SALE—A Good Time to Buy

Crushers—Gyr. 7½K—8K—Jaw 10x36—Rolls 42x16.
Loco. cranes steam RR 50 ton—40 ton—30 ton.
Crushers—3' Cone 30x42 Pul. 48x60 Jaw.
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Compressors—3 Sullivan WH 101 with diesels 500 CFM.
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Crushers jaw 66x86—60x84—dryers 4'x30'.
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Cars—100 side dumps 20 yd. steel.
Draglines—Page 220-CI, 24-55B-4W-5W Lima 450.

A. V. KONSBERG, 111 W. Jackson Blvd., Chicago

WANTED

One used hammer mill for pulverizing limestone. Approximate size 36x24 to 42x48. Also one, one-half yard rehandling dragline bucket.

Send all replies to
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Government crawler type Caterpillars, size "35," $375; size "65" with nigger head winch, $750.
Trailbuilder Cletrac "55" with angledozer, $1125.
Caterpillar RD8 with bulldozer, $2000.
Allis Chalmers Model L with bulldozer, $1750.
All slightly used, overhauled, guaranteed.

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WANTED

48" or 60" Symons Cone crusher in good condition.

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1—24" portable unit 45' long.
1—24" stationary unit 100' to 140' long.
Complete with belts and gasoline motors.

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1—Ingersoll-Rand. 676 cu. ft., cylinder size 15x9¼x12. Belted. With or without electric power.

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2—Hayward Dwarf Orange Peel Buckets. Several dragline buckets from ¾ to 3½ cubic yard.

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2—Lorain 75-B. 1¼ yard.
1—Industrial Brownhoist Crane. Gasoline. 60' Boom. 16-tons capacity.
1—Little General Shovel. Gasoline ½ yard dipper.
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1—10x12 3-drum Lambert Steam. With space for boiler.
1—11x12 3-drum American. Steam. With banked levers. Oil fired boiler.
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All Sizes of Head & Tail Pulley Assemblies.
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18" Haiss Digging Bucket Loader, wheels.

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Belted Air Compressors: 173' and 360'.
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Pumps, 1,000,000 gallons and down.
300 HP GE MT Slipring, 2200 v. 514 RPM.
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Can furnish any size and speed in Motors, Slipring, Induction or Synchronous.
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Ring Roll Mills—No. 0 and No. 1.
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1—12" electric steel portable hull dredge with Swintex Ladder.

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1—24" dredge pump—new.

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1—Bucyrus-Erie 37-B Gas Shovel 1½-yd. new 1932, rare bargain.
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1—Lorain-40 Truck-Shovel attachment ¾-yd.

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2—15-ton cap. Northwest No. 4 Gas Cranes, Nos. 3793 & 3489, 40-50-60-70' Booms, overhauled in excellent condition. One with dragline fairlead.
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1—13-ton cap. Universal-Lorain Truck-Crane, 40' Bm. 4-sp. Mack, pneumatic tires, new June, 1939.

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PRICED FOR QUICK SALE

1—48" Symons Horizontal Disc Crusher (Nordberg Mfg. Co.), completely overhauled, rated capacity 1" product, 45-60 T.P.H. $1,000.00

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Several Vibrating Screens, Bucket Elevators, Sand Classifiers, Electric and Gasoline Motors, 2", 3", 4", 6" Self-priming centrifugal pumps with gasoline motors; 1½", 2", 3", 4", 6" centrifugal pumps with electric motors.

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Above compressors are like new, have been used only a few months.

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1—P&H ¾ yard Shovel Boom Assembly for Model 206.

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DIESEL: 603, 807 & 1000 Ft.
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CLAMSHELL: ⅛, ¾, 1, 1½ & 2 Yds.
ORANGE PEEL: ¾, 1, 1½, 2 & 3 Yds.
DRAGLINE: ⅛, ¾, 1, 1½ & 2 Yds. Cap.

CRANES & DRAGLINES

5 Ton BROWNHOIST, 30 ft. Boom Gas.
12 Ton NORTHWEST 50 Ft. Boom Gas.
12 Ton KOEHRING 45 Ft. Boom Gas.
16 Ton Speedcrane, Gas, 50 Ft. Boom.
25 Ton BROWNING & 30 Ton AMERICAN Locomotive.
25 Ton LINK BELT K-48 Electric, 70 Ft. Boom.
2½ Yd. Lorain Model 95, Diesel Dragline.

CATERPILLAR SHOVELS

½ Yd. P. & H. Gas & ⅜ Yd. Insley Gas.
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¾ Yd., 1¼ Yd., 2 Yd., 4 Yd. & 8 Yd. MARION Electrics.
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6x8 Continuous Pebble Mill.
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3½x8 & 5x7 Air Swept Tube Mills.
2x4½, 3x12 and 6x12 ROD MILLS.
4x16 Smidth Tube Mill Silex.
5½x20 Smidth Tube Mill Mang. Linck.
5½x18 P & M Tube Mill Silex.

PULVERIZERS

No. 1 Sturtevant Ring Roll.
RAYMOND Auto. Pulverizer No. 0000, 0 & 3.
RAYMOND Imp Mills No. 4, 32 & 55.
GRUENDLER XXB Mill & Jay Bee No. 3 & 4.
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14 ft., 8 ft. and 12 ft. Separators

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36x60 Fairmont Single Roll.
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24x14 Pioneer Double Roll.
24x12 P & M Double Roll.

JAW CRUSHERS

10x8, 13x7½, 14x7, 15x9, 15x10, 16x9, 16x12, 16x10, 18x11, 20x8, 20x6, 20x10, 20x12, 20x11, 26x12, 30x15, 30x13, 36x30, 36x18, 36x14, 36x15, 36x9, 36x6, 38x18, 36x10, 36x24, 42x9, 48x36, 60x42, 84x66, 36x16, 9x36.
30x10 Gruendler Roller Bearing.

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42 in. McCully Mammoth Gyratory.
18 in., 24 in., 30 in., 36 in. and 48 in. Symons Disc.
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16" Traylor.

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7 Gasoline 15, 40, 60 & 100 H.P.
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8 Electric 20, 35, 50, 60, 100 & 150 H.P.

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4—SANDERSONS 14 & LOOMIS 44.
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72 Ton BLAW-KNOX 2 Compt.; also 250 ton.
100 Ton BLAW-KNOX 2 Compt.

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400 Bbl. Portable BUTLER Bulk Cement Bin with Fuller Full Automatic Electric Push Button Weigh Batcher.

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100 K.W. RIDGWAY 3/60/2200-250-275 volt
150 K.W. GEN. ELEC. 3/60/2200-250-275 volt
200 K.W. RIDGWAY 3/60/2200-250-275 v., 900 rpm.

SLIP RING ELECTRIC MOTORS

52 H.P. GEN. ELEC. 3/60/220-440 v., 1200 rpm.
(3) 100 H.P. GEN. ELEC. 3/60/220-440 v., 900-1200 rpm.

RUBBER HOSE

Air: ¼ in. to 1½ in. Water: ¾ in. to 10 in.

CONVEYOR PARTS

BELT: 1000 Ft. 60 In., 700 Ft. 42 In., 600 Ft. 36 In., 800 Ft. 30 In., 1642 Ft. 24 In., 517 Ft. 20 In., 297 Ft. 18 In., 1000 Ft. 14 In. & 16 In.
IDLERS: 36 In., 30 In., 24 In., 20 In., 18 In. Head & Tail—Pulleys—Takeup for all sizes.
Steel Frames: 2,000 ft. 24 In., 30 In. & 36 In. Sections.

ROTARY DRYERS AND KILNS

36 In. x 20 Ft., 3 Ft. x 30 Ft., 4 Ft. x 30 Ft., 54 In. x 30 Ft., 42 In. x 24 Ft., 5 Ft. x 30 Ft., 5 Ft. x 16 Ft., 5 Ft. x 60 Ft., 6 Ft. x 60 Ft., 6 Ft. x 70 Ft., 70 In. x 40 Ft., 5x30 & 8x84 Double Shell Dryers, 8x110, 7½x100, 8x125 & 10x20 Kilns.

STEEL DERRICKS

GUY: 8 Ton 85 Ft. Boom, 15 Ton 100 Ft. Boom, 20 Ton 115 Ft. Boom, 50 Ton 100 Ft. Boom.
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LOCOMOTIVES

GASOLINE: 3 Ton, 5 Ton, 8 Ton, 12, 14 & 30 Ton.
STEAM: 9 Ton, 20 Ton, 40 Ton, 60 Ton & 80 Ton.
ELECTRIC: 2 Ton, 5 Ton, 8 Ton, 17 Ton & 40 Ton.

SCREENS

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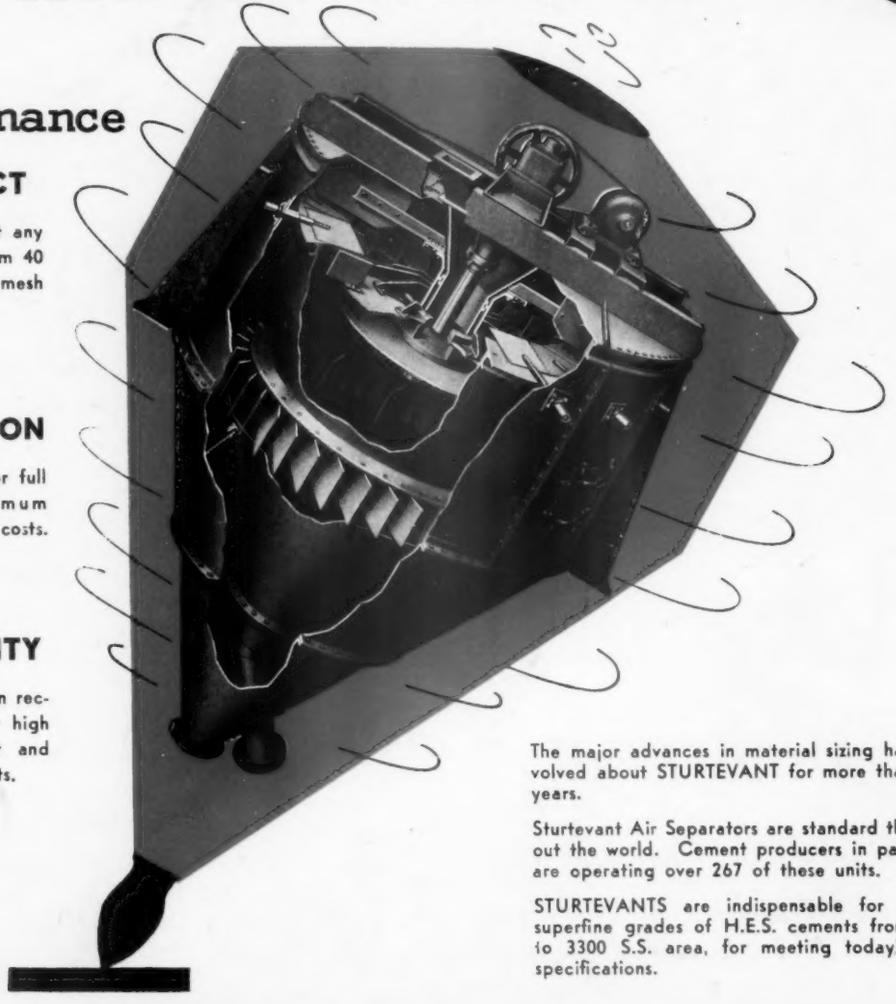

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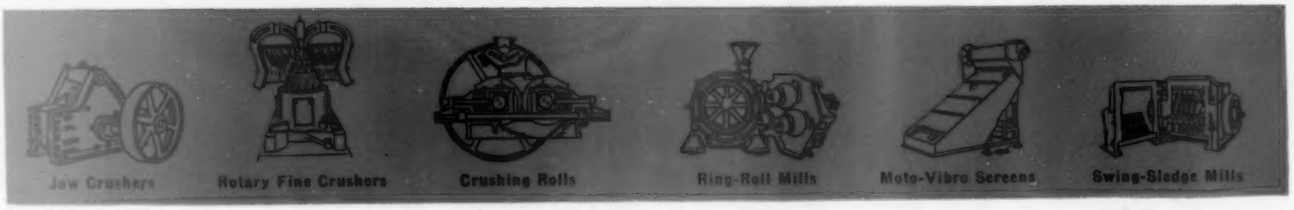
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